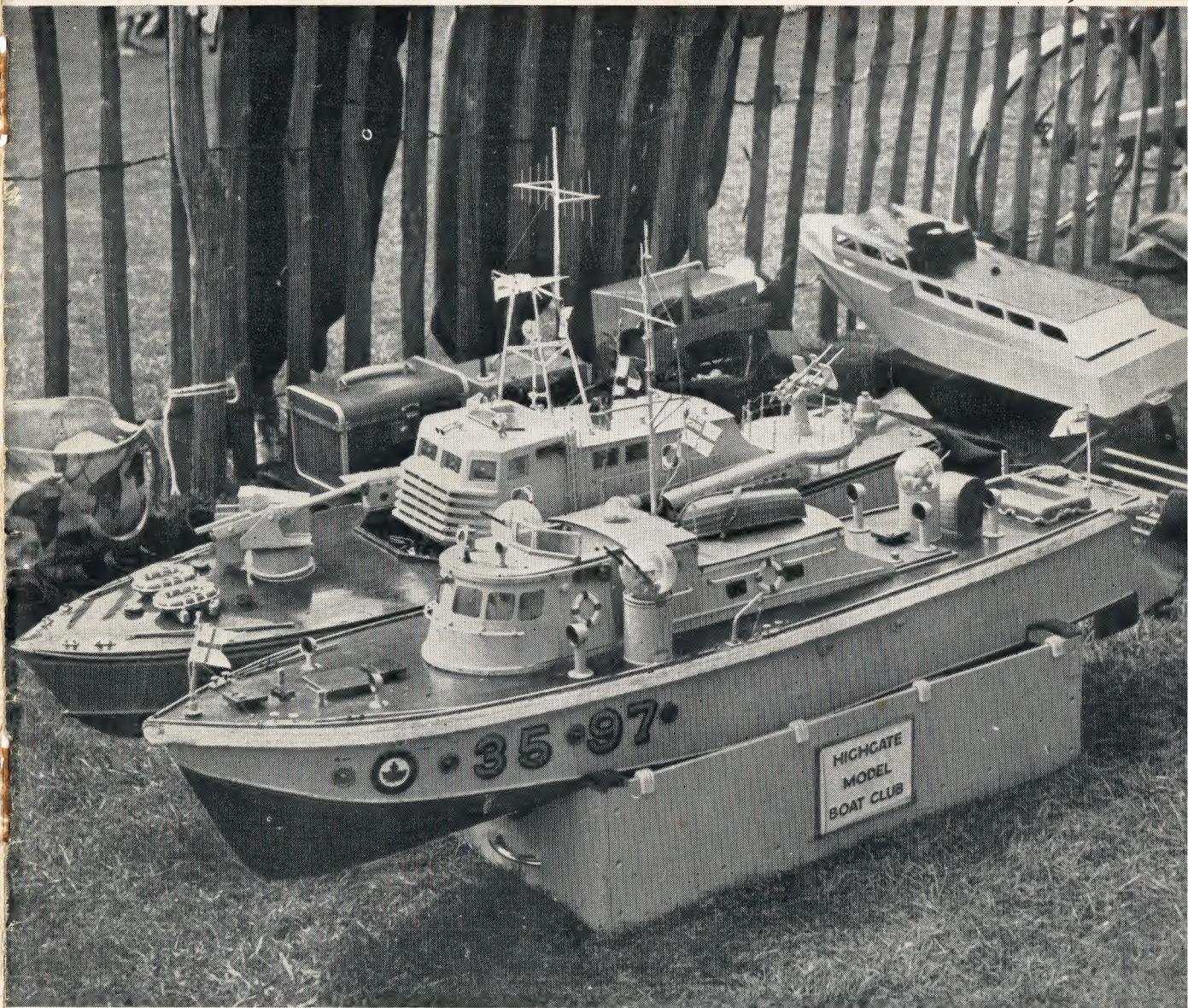


259

# Model Engineer

THE MAGAZINE FOR THE MECHANICALLY MINDED

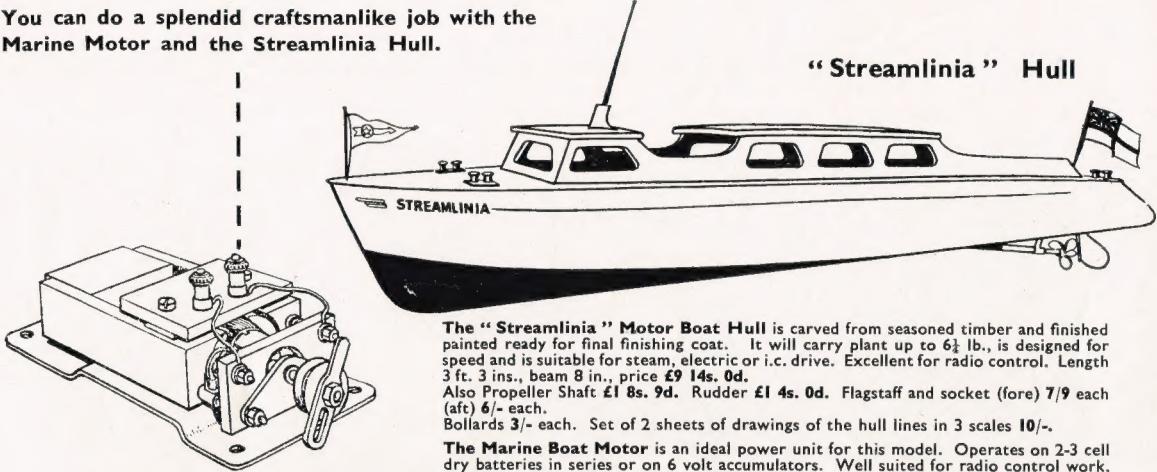


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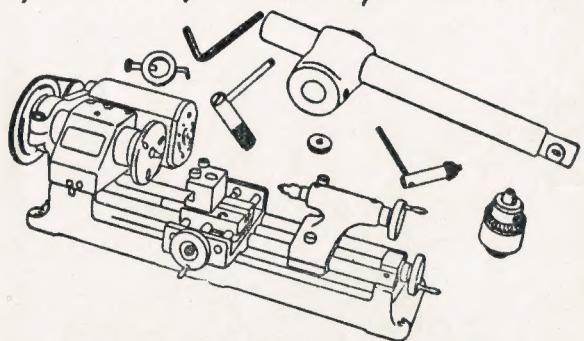
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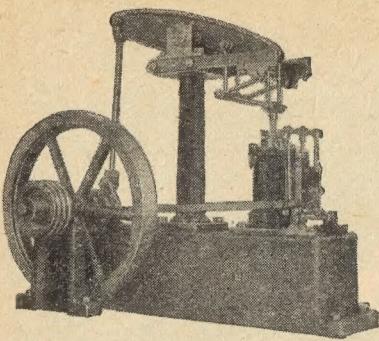
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# Model Engineer

ONE SHILLING 5 SEPTEMBER 1957 VOL. 117 NO 2937

Published every Thursday Subscription 58s. 6d. (USA and Canada \$8.50) post free

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### A WEEKLY COMMENTARY BY VULCAN

IT may be that, compared with many years ago, the Model Engineer Exhibition has not the family flavour that it once had. I have heard that said more than once, but I am not sure that its origin is not in the bad memory which nostalgia seems to induce. Men who missed their friends this year tend to think that everybody else was the same and that the occasion has lost some of its intimacy.

For myself, I was continually meeting old friends and model engineers whom I was glad to see again. I kept my ears and eyes open and much the same happened with many of my acquaintances. For example, Edgar T. Westbury hardly walked across the Horticultural Hall without being stopped, and without swapping a yarn.

On the other hand, of course, it is true that many people go to the Exhibition without previous knowledge of model engineering. They are attracted by the television publicity, by the newsreels, by the newspaper stories, or by the sound broadcasts. That, too, is an excellent thing.

### Shop window

One of the virtues of the Model Engineer Exhibition is that it acts as a shop window for the movement and that both young and old are given the impetus to take up some work themselves. There is always the danger that the excellence of the models may act as a deterrent in that a beginner may feel he cannot possibly emulate such

wonderful craftsmanship. But stewards do emphasise, first, that the models on show are *crème de la crème* and second that the equipment used by several outstanding exhibitors is inexpensive and comparatively elementary.

Finally, perhaps I should add one point to all that is written about the ME Exhibition. It is that there is a popular misconception that we make a thumping profit out of it. That is far from the case; in recent years the loss has been substantial and regular. This is to some extent compensated for by the old friendships we renew, by the new ones we make and by the men and boys who become interested in modelling generally.

### Bristolian in a hurry

THIS famous train, timed to run the 118½ miles from Paddington to Bristol Temple Meads in 105 minutes, is the fastest train on British Railways, with its average speed of 67.5 m.p.h. start to stop. It is quite an exhilarating sprint if run strictly to time; but it can be exciting when, for any reason, the engine clips some minutes off the fast schedule, which was done to some purpose on August 8.

On this day, in order to accommodate a special party, the normal seven-coach train of 245 tons was increased to eleven coaches representing a total load of 350 tons. The engine was No 6019, *King Henry V*, and I am told that, right from the start, the driver made it clear that he was not letting the extra load daunt him.

## Smoke Rings . . .

The train passed Reading 1½ minutes ahead of time, increased to 3½ minutes early at Swindon, and this with no higher maximum speed than 82 m.p.h. Down the Dauntsey bank, however, after a slight easing through Wootton Bassett, speed rose to 96½ m.p.h. and was maintained at more than 80 until the Box Tunnel had been cleared.

The check through Bath station was scrupulously observed, but a maximum of 74 was reached on the 12-mile stretch between there and Bristol. The stop at the latter place was made in just 99 minutes from Paddington, so the average speed for the entire trip was 71.4 m.p.h.

Such a run as this can only be described as a little masterpiece of driving, operation and organisation, the locomotive crew and the signalmen en route carrying off the chief honours.

### The Travolator

IT seems that we have a new word in the realm of transport—Travolator. This is clear from the recent announcement that travolators instead of escalators are to be installed at the Bank station on the Waterloo and City Railway. They will be the first to be used in Britain—or will they?

A travolator is described as being a continuous moving belt having the safety features and speed of an escalator, and consisting of a series of metal strips fitted together to form a continuous surface.

This seems to be remarkably like a so-called moving stairway that was in use at the Crystal Palace in 1901, and it does not appear to be so very different from the "never-stop railway" which was a novelty at the Wembley Exhibition in 1924.

However, work is already well in hand at Bank station where a new tunnel is being constructed to accommodate two travolators, each 4 ft wide and about 300 ft long. The existing subway is to be retained for use in emergency and for passengers walking against the main flow during rush hours.

### Car brakes

I WOULD have thought, being a layman in dynamics, that the application of brakes to the front wheels only of a fast-moving car would have been far more likely to precipitate a skid than braking on the rear wheels only. But my assumption is ill-founded.

In an address given to the Royal Institution of Great Britain on "Speed on the Road and its Related Effects," W. H. Glanville, Director of Road Research at the Department of Scientific and Industrial Research

### Cover picture

Two fine examples of the ship modellers craft produced by members of the Highgate Model Power Boat Society

pointed out that entirely the opposite occurred in practice.

Tests with a model car had established this fact. By launching it down a ramp from different heights the model attained different speeds and a device fitted to it applied either the front or rear brakes as it ran on to level ground.

When the rear brakes came on, the model sheered off sideways, an action which developed into a swerve of varying intensity depending on the speed. With only the front brakes working the car continued in a straight course.

This test by the DSIR proved two facts: the importance of the proper distribution of braking between front and rear suspensions; and the very practical use to which models can be put.

### Toll for the brave

ALMOST exactly 175 years ago *A* the *Royal George* was lying at Spithead ready for refitting after her battles with the French. So that a leak might be mended a little below the waterline, the guns were shifted—with what dreadful results everyone knows:

*Toll for the brave*

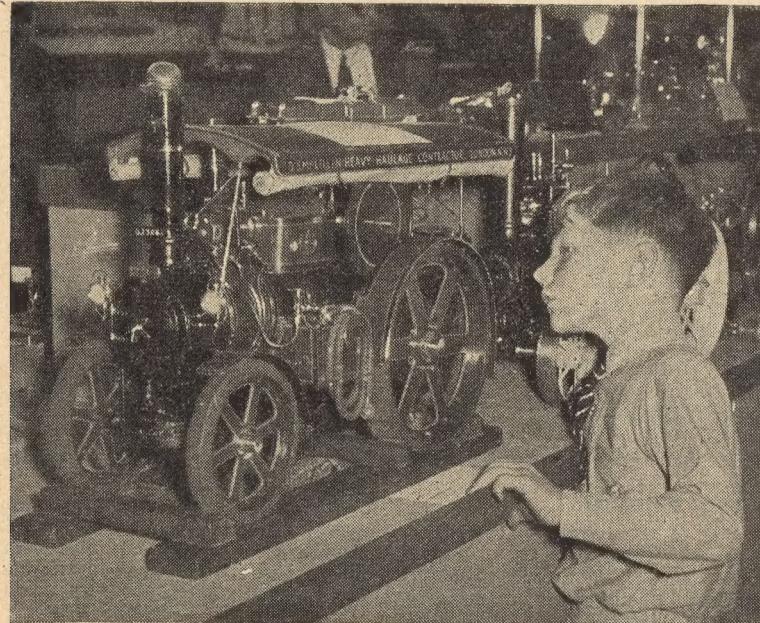
*The brave that are no more . . .*

What books are there on the *Royal George*? The question comes to us from a keen Californian reader. Although he is presumably thinking of a fairly modern book that could be bought or borrowed in the ordinary way, I should be glad of any title, however obscure.

The only title known to me is rather a mouthful: *A Narrative of the Loss of the Royal George, at Spithead, August 1782, Including Tracy's Attempt to Raise Her in 1793, Also Colonel Pasley's Operations in Removing the Wreck by Repeated Explosions of Gunpowder in the Years 1839-40.*

By courtesy of the National Maritime Museum at Greenwich I have examined the second and fifth edition, both bound in wood from the actual wreck. They were printed and published by S. Horsey Senior, of 43 Queen Street, Portsea, and would have appeared at the period of Colonel Pasley's operations. The second edition is dated 1840 and the fifth 1842.

I have seldom seen a smaller book with so long a title.



D. S. MacLellan, of North-west London, built this fine example of a model road locomotive which was on show at the Exhibition. It has a water-tube boiler, a single cylinder and two speeds.

## AT THE ME EXHIBITION

# FIRST IMPRESSIONS

By Joseph Martin

EVERYTHING that one would have expected was there, and much else besides. Looking back over a long road where the Model Engineer Exhibitions stood like milestones, a veteran modeller said that the 1957 show had more variety than any he could remember. "And," he added, "I also can't remember a better one."

From an old hand this was praise indeed. As the years slip by, the things that we enjoyed in our younger and freer days seem brighter in memory than they were in fact. Add to this the critical attitude which the Earl of Northesk says is characteristic of the model engineer, and you will agree that the old-hand is very hard to satisfy!

It, therefore, says much, and perhaps everything, for the 1957 Jubilee Exhibition that the oldest visitors were as clearly pleased as the youngest. The balance between the traditional and the modern, the expected and the unexpected, could hardly have been better.

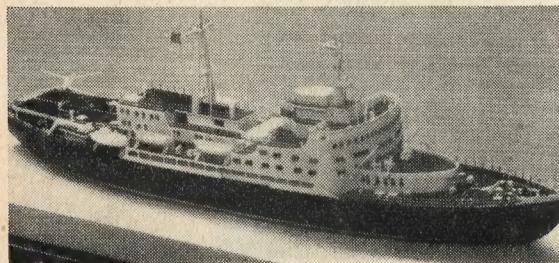
Can we fail to see in this a happy sign for tomorrow? In the familiar hall at Westminster the modellers of Britain were entering their second half-century as an organised movement—and entering it in a spirit exactly right for the occasion. From the antique locomotives we stepped across to the diesels, from a sailing

ship we passed to an atomic ice-breaker, and in the din of fast racing cars we stopped to admire a Cornish pumping engine. Here were the past, the present, and the future that is born of them both.

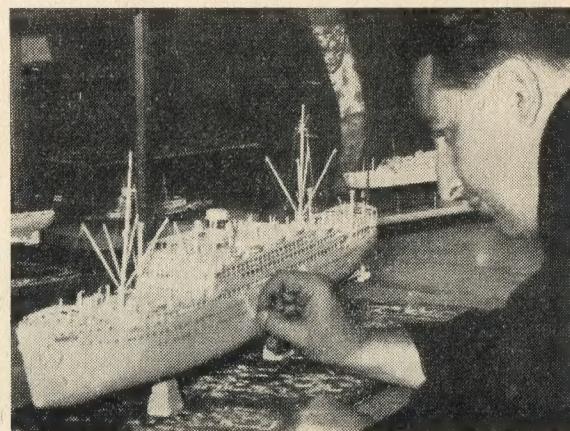
No one appreciated this peaceful co-existence of the old and the new more than our Russian visitors, fresh from a land where the two exist in fierce contrast. The Russians themselves were, of course, the centre of tremendous interest, and so too were the models that they had brought. Which is the rarer in England, a Russian modeller or a ship modelled in ivory, platinum, gold and rubies?

Djalal Yusopov was represented by two cruisers and the motor ship *Pobeda*. One cruiser was the *Sverdlov*, remembered as a visitor at the Spithead Coronation Review and at Portsmouth two years later. Mr Yusopov had fashioned her in gold and ivory with jeweller's and locksmith's tools. These were also employed by him in making his cruiser of the Voroshilov class.

*Below: A model of the Soviet atomic ice-breaker, LENIN, one of several models exhibited by the Russians*



5 SEPTEMBER 1957



*Below: Djalal Yusopov with his ivory model of the cargo ship POBEDA*

Most remarkable of all he had used rubies as well as ivory and gold to model the *Pobeda*, the rubies serving for portholes. His *Pobeda* won a prize at Kiev this year.

Undoubtedly the visit was a sensation. It is usually easier to remember a particular Model Engineer Exhibition than to attach the year when it was held, and I am sure that in five or ten years' time we shall be speaking of 1957 as "the year the Russians came."

I enjoyed my many meetings with Alexander Bliznakov who speaks English well enough for conversation to be possible. Of him, of his comrades, and of modelling in the Soviet Union I hope to say more in another article. Let it suffice for the present that he forsook his own great annual exhibition in Moscow to be present at the Model Engineer Exhibition in London; and he happens to be no less a person than the director of the Central Marine Club which organises it all!

This seems to me a remarkable gesture towards the model engineers of Britain quite apart from the effort and the journey (to use the words of Lord Northesk) that the visit involved.

All the nine Russian models were ships, these being the favourite subject of modellers in the USSR. One of them in particular astonished the public: the tiny sloop not much longer than a cigarette which Mikhail Chernakov, a technical worker in Leningrad, had constructed of more than 3,000 parts in ivory and tortoise-shell. To be fully appreciated the detail needed to be seen through a magnifying glass.

Similar craftsmanship distinguished the other ships in ivory and was present also in the larger models. Even in model engineering the

Russians are fast workers: Arkadi Ushakov, a Leningrad metal worker, had built his atomic ice breaker—not in metal but in plastic—from the plans of a vessel which has yet to be launched.

Earlier this summer, as the guest of North London SMEE, I met a modeller at work on a tiny marine engine. "I'm a disciple," he said, "of A. A. Sherwood. He's on the other side of the world now but I'm still under his influence!"

Now, from the other side of the world, our old friend has sent us a positively staggering creation of his skill for the minute. Not content with building an OO gauge 2-10-10-2 Virginian locomotive, he turned to OOO gauge, 2 mm. scale, and produced a locomotive which was one of the exhibition marvels in 1951.

Even this did not satisfy him. Going one better, and one smaller, he has since constructed in OOO gauge an engine which is beyond much doubt the tiniest model steam locomotive in the world. It is an 0-6-0 tank engine fitted with ingenious slide valves.

As we would expect, the show had a good number of antique locomotives to delight the modeller, the railway historian and the general visitor. Among the Transport Treasures under the full-scale signals sent by British Railways to frame the vista from the mezzanine steps, we discovered the lordly *Emperor*, one of the last engines in broad gauge. The original was built with 8 ft wheels at Swindon in 1880 by William Dean, who retained the general Gooch design, and the model bears on a brass plate the words: "Constructed by John G. Robinson, Bristol 1883."

John Turner's *Eclipse*, a few feet away, provided a similar double link with the past, in the sense that both the original and the model belong to long ago. The *Eclipse* represents the 1840s and John Turner made his brass model of her in 1841.

Other treasures of special value

were London buses straight from the cover of the *Strand* as we knew it years ago, and a GER passenger coach of 1885 modelled by William Coney, of Stratford Railway Carriage Works, with mahogany and boxwood from the ill-fated steamer *Princess Alice*, which sank in the Thames. The model William spent six years on his model.

Nothing in the whole show commanded more respect from the railway lover than the charming 0-4-2 *Lion* in 3½ in. gauge, beautifully fashioned to LBSC directions by F. F. Few, of Hatfield. The full-scale engine, No 57 on the Liverpool and Manchester, was used in making *The Titfield Thunderbolt*.

We also liked the gay green coal-fired locomotive which Mervyn Vest of Chester-le-Street had been inspired to model from Sir Vincent Raven's 4-4-4 North Eastern of 1913. Seen together these made a colourful pair. Quite in contrast with them was a model of 1953 cup winner *Puffing Billy*, which J. S. Youngman of Chichester had given an old, coaly appearance, like the model engineer I met in Wales who deliberately lets his constructions weather in the garden.

If the Hatfield *Lion* looked a certain winner there could be hardly less doubt about the Schools-type *Louisa* developed by R. P. Holdstock, of St Leonard's-on-Sea, from LBSC's *Roe-dean*. But the public gave even more attention to the Lancs and Yorks Aspinall 0-6-0 goods of 1889 built in 1½ in. scale by Louis R. Raper of Manchester. The BBC television men, who liked it well enough to film it in close-up, were right in thinking that the judges would like it too.

All these engines and the many others which kept them company belong to the Age of Steam. When I recently described the latest diesel from the Vulcan factory at Newton-le-Willows some readers wanted to know where they could find a model engineer with the slightest interest in

diesel traction. I hope they saw the diesels at the Exhibition. There were six or seven of them; all of which shows that the world of modelling is far wider than the individual with his own special interests or prejudices may suppose.

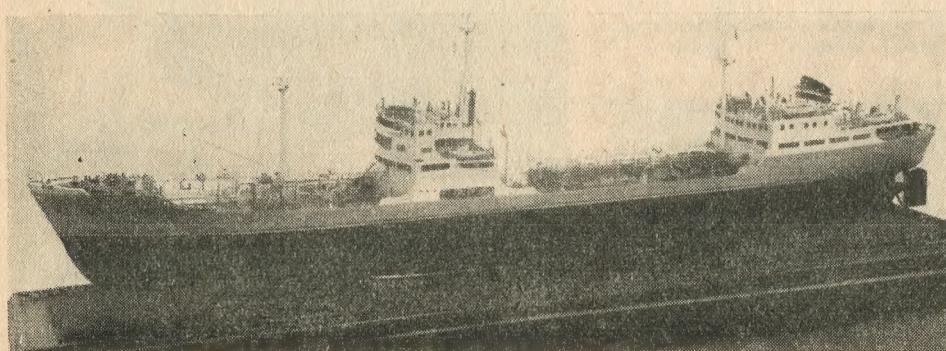
Indeed, the 1957 Exhibition was far richer in diesel locomotives than in traction engines. Why this should be so when the traction engine enjoys such enormous popularity is a mystery that I shall not attempt to solve. As it was, we had a single-crank Burrell Light Devon engine from E. Hincliffe, of Rochdale, a free-lance copy of a Marshall roller from Donald S. MacLellan of London, and an Aveling ME road roller from W. T. Eridge of Staines.

Where were the Allchins? I was asked this question by Charles Boon, a robust Somerset man who has read MODEL ENGINEER for many years and has loved "the old tractions" of the countryside ever since he was a boy.

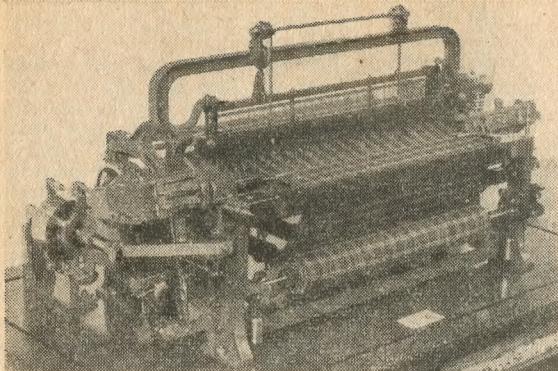
Viewing the Exhibition on any day, it would have been impossible to say which were the more popular, the locomotives and railways or the ships. What a world of interest, of knowledge, and of contact with the lives of our fellow-men in all places and ages is laid open to us in the high craft of ship modelling! Here were exotic craft belonging to far-off lakes and rivers, and elegant sailing vessels equally distant from us in time. Miniatures in glass cases lost none of their pride in the shadow of big, fleet racing yachts or business-like tugs.

However great our haste to see all that waited to be seen we had to stop, admire and study when we came to a model like the steam-going tug *Energy* or the cabin cruiser *Edie*, the work of Charles Blazdell in Norton and William Morss in London. Memories of the *Flying Enterprise* gave a special interest to the *Turnoil*, at 3 in. scale from J. Caller and J. Hever, of Eynsford.

I spotted four American vessels in



This model of the MOCKBA, a Russian tanker, was built by Alex Vicherov, a metalworker from the Ukraine. It is to a scale of 1/100



Above: Modified Dobcross underpick tappet loom constructed by T. W. Millward, of Manchester

Right: Sixteen-year-old John Dennys, of Bayswater, with his electrically driven model of the Royal Yacht BRITANNIA



close company. One was B. G. Phillips' Gloucester fishing schooner, loaded with memories of *Captains Courageous*, and another was G. MacKay Smith's USS *Constitution*—the glorious frigate Old Ironsides, 160 years old in two weeks' time.

*Ferry Ahoy*, E. C. Freeston's Thames scene of 1790, brought us the old tang of the river. Other works with the vividness of a three-dimensional picture were A. E. Field's brilliant model illustrating the busy Severn of the late 18th century, and Lieut.-Commander T. F. Richards' remarkable scene presenting the gun crews of *Victory* in action on 21 October 1805, the day of Trafalgar.

Elsewhere in the hall one of C. B. Reeve's beautiful clocks—all the clocks shown were of exquisite craftsmanship—had for neighbour a full trichord 85-note piano of the early 20th century. It was lent by H. A. J. Smith, who lives at Bexleyheath.

In these quick impressions I have picked out some of the things which struck me, not necessarily the best things but a sample of those which in one way or another were unusual, original, or specially attractive to the crowds. Naturally there were a great many others, ranging in variety from superb stationary and marine engines (one of them a masterpiece by A. W. G. Tucker) to the big model of a Ruston crane tirelessly moving gravel to and fro. and *A Case of Little Men* constructed by the irrepressible Michael Oxley as the indirect result of eating too much cheese before bedtime.

Many of the special attractions I have described in an earlier article—and need I say that the SMEE passenger track, with its automatic signals and its magnificent array of locomo-

tives, was kept as happily busy this year as in 1907, or that the SMEE stand was once again full of first-class work fascinating to watch and study?

These pleasures can be taken for granted, together with all the continuous background activity, the workshop demonstrations, the flying aircraft, the radio-controlled ships, the positively hysterical racing cars.

I was sorry for the suffering mothers who were whirled from the fine display of model aircraft to the Barrett and Emett railways, from the demonstration tank to the Model Shop and the electronic entertainments, by little boys eager to see everything at once.

The juniors themselves had a proud place in the show. There were, in particular, among the loan models and Students' Cup entries, no fewer than twenty exhibits from Tyler's Croft School MEC, one of them being a group of engines, boilers and small machines, the work of twenty boys, and another a small lathe made from milk bottle tops!

With a Mercury Saturn aircraft valued at 4s. 9d., Stephen Blay, of Edgware, had the distinction of being the youngest exhibitor, though Adrian Bomback of North Harrow is already a veteran at 11, having been a modeller for seven years. From Bayswater 16-year-old John Dennys sent the *Britannia* which was taken, by invitation, to the Duke of Edinburgh at Buckingham Palace. He also proved his skill in a model of the American four-mast schooner *Helen Barnet Gring*.

At the other end of the age scale we found E. Baynes Rock, a retired merchant of Bexhill-on-Sea, showing a ship model at the age of 88—a Lowestoft sailing trawler on which

he had worked for a thousand hours. Mr Rock is eight years senior to Lieut.-Commander T. F. Richards, whose work has the colour and energy that we associate with youth. I wonder how many of the public could have guessed that the *Victory* scene had been sent by an octogenarian?

There was as much variety on each of the attractive club stands as there was in the main body of the hall. In Russia, as Mr Bliznakov explained to me, the prize-winning entries from the local shows in the big towns and cities are sent as a matter of course to the annual exhibition in Moscow. Why should we in Britain not do the same when the Northern Federation has already shown us the way?

This is one of the ideas which the 1957 exhibition has left behind it. Another is the contribution that might be made from the United States. Across the Atlantic we have many thousands of modellers linked to England and kept in touch with one another by the pages of MODEL ENGINEER—yet the American models at the Exhibition, such as Old Ironsides, are almost invariably built by Britons. It was the Russians who asked me why the Americans did not send some of their work to London. Well, why don't they? The Model Engineer Exhibition, as the Russians have realised, is open to the world.

It would be pleasant to open our second half-century with a selection of American models beside the others. Meanwhile, happily, the Jubilee Exhibition shows the movement in Britain facing the future in the strength of a continued respect for the past and an equal eagerness to reflect the ever-hurrying present. May it still be so in the year 2007! ■

# MYRMIDON

## A SHIP-RIGGED SLOOP OF 22 GUNS

**Part 9—With the exception of certain lifting tackles—to be discussed later—R. J. COLLINS now deals with the final rigging details related to the yards**

*Continued from 1 August 1957, pages 162 to 164*

THE fore and main topgallant ties (Fig. 118) are of  $2\frac{1}{2}$  in. and are attached direct to the yards. From there they go up and through the sheave at the masthead and then down (in the model with the yards lowered) about a third of the distance from the topmast head where they end in a single 6 in. block. Another 6 in. block is stropped to an eye bolt in the lower top.

The 2 in. halliard runs from the top block to the lower, back to the top and then straight down to belay. The fore goes to the second pin on the fore jib bitts and the main central pin of the bitts abaft the main mast. The mizen tie is 2 in., the blocks 5 in. and the halliard 1 in. It belays to the second port side ring bolt aft of the mizen mast.

The royal halliards (Fig. 119) are all of  $1\frac{1}{2}$  in. They start at the yard, pass up through a sheave in the masthead and down to a cleat aft of the topmast halliards. The bow and mizen halliards are on the starboard side, with the main on the port side.

Lifts are the ropes which are attached to the ends of the yards; these keep them square and help to support their weight.

Starting with the sprit top lift (Fig. 120) a  $1\frac{1}{2}$  in. rope made fast to the arms with a splice goes forward to the shoulder of the jib boom where there are a couple of thimbles, one each side (Fig. 113). The rope passes through these and down to the outer hole of the saddle and belays to the port and starboard knight head.

The sprit yard lifts are  $2\frac{1}{2}$  in. with the standing end secured to the sprit cap. From there they go out through the 9 in. blocks at the yard arm, back through the 9 in. blocks at the cap and down the bowsprit, then through

the second holes in the saddle, belaying to the same points as the sprit top lifts. If you intend to fit the "sail rigging" these standing ends engage with the sprit top clews.

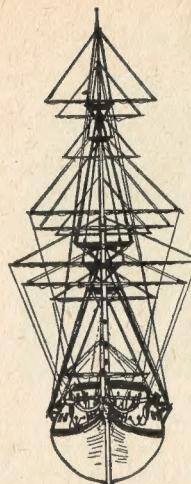
The fore lifts of 3 in. (Fig. 122) with the standing end from a becket of a 10 in. block are secured to the fore cap by a span. From there they go to a 10 in. block (stropped to the sheet block) at the yard arm, back to the block at the cap and down through the lubber hole to belay at the keel opposite the mast. The main lifts are similar, but with 11 in. blocks.

The crojack lifts are of 2 in. with 7 in. blocks and have a similar run except that they belay to the side pins on the mast rack.

The fore top lifts (Fig. 123) could start by being hooked to a span over the cap but I prefer them attached to the top gallant clew (as I have drawn them) which otherwise would hang loose. From wherever they start they run to a 9 in. block at the yard arm and then back through the lower sheave of the sister block which is lashed between the shrouds. From there they go down through the lubber hole to belay to a cleat on the second shroud.

The main is similar except that it belays to the first pin on the forward pin rack. The mizen top lifts (Fig. 124) start at the cap, go down to the 6 in. block at the yard arm, back through a 6 in. block with a long strop from the masthead and then down to belay on the first shroud cleat.

The topgallant lifts (Fig. 125) are of 2 in. with the standing end spliced to the yard arm. From there it goes up and through a thimble lashed to the first shroud near its head and down to belay beneath the after top dead eye. The main and fore are the same, and the mizen is similar but with  $1\frac{1}{2}$  in. rope. In Fig. 126 I show



the run of blocks beneath the fore top; there is a similar row at the back of those shown.

The braces are the ropes which control the fore and aft movement of the yard arms, and the sprit top brace (Fig. 127) is a 2 in. rope which is spliced direct to the yard arm. It goes up and back to reeve through the inner pair of blocks hanging beneath the fore top and then down to belay on the fo'c'sle rail.

The sprit yard brace (Fig. 128) has a 3 in. pendant 8 ft long, excluding the 9 in. block. The standing end of the 2 in. brace is at the loop of the fore stay. From there it goes to the pendant block and up to the inner sheave of the outside pair of double blocks slung beneath the top, then down to belay at the fo'c'sle rail.

The fore brace (Fig. 129) with a 4 in. pendant 10 ft long ends in a 10 in. block. The standing end of the brace is made fast to the loop of the main stay and from there it runs to the pendant block and back to a 10 in. block stropped to the stay just above the standing end, then down to reeve through the outer sheave of the fore brace bitts. These are the bitts before the mainmast. It belays over the top of the upright.

The main brace (Fig. 130) also with 3 in. rope and similar-size pendants and blocks, starts at the lower ring bolt on the outside of the hull and finishes via a 10 in. block—it could be a larger snatch block—stropped to an eye-bolt on the capping rail just forward of the aftermost swivel, and then to a cleat on the deck.

The crojack brace (Fig. 131) has a 2 in. pendant 6 ft long with a 6 in. block attached to the yard 4 ft in from the end. The standing end is made fast to the inside of the sixth main shroud just below the futtock stave and to the other side from the pendant. From there it goes over to the pendant block and back to a 6 in. block stropped to the shroud a little below the standing end and down to belay at the fourth pin in the forward pin rack.

### Fore top brace

The fore top brace (Fig. 132) starts with a  $3\frac{1}{2}$  in. pendant 10 ft long with a 9 in. block. The brace itself, of  $2\frac{1}{2}$  in., has its standing end a little below the standing end of the fore brace and runs forward to the pendant block, back to a 9 in. block—again just below that of the fore brace. From there it runs parallel to the main stay to another 9 in. block on the stay, a little aft and above the fo'c'sle rail and then down to belay at the rail.

The main top brace (Fig. 133) has its components of the same sizes as the fore top brace. Its standing end

is at the loop of the mizen stay, and the line comes back to a 9 in. block on a 4 ft pendant from a span immediately above the band of woolding, then from there down to the keel level with the mizen mast.

The mizzen top brace (Fig. 134) has a 2 in. pendant 5 ft long, ending in a 6 in. block. The 1½ in. brace starts about 18 in. down from the peak of the gaff and goes forward to the pendant block, back to a 6 in. block on the gaff about 18 in. further down and then down to the outermost cleat on the inside of the taffrail.

The top gallant brace (Fig. 135) of 2 in. starts direct from the yard and runs back to a 7 in. block at the top of the main-top stay, then down to another 7 in. block stopped to an eye in the after rim of the fore top and so down to belay at the rail. The main top gallant, also of 2 in., goes straight from the yard to a 7 in. block

stropped to the loop of the mizen-top stay and then down via the mizen lubber hole to belay at the cleat on the fourth mizen shroud.

The mizen top gallant brace of 1 in. runs from the yard through a thimble on the peak above the standing end of the mizen top brace, and down to the middle cleat on the inside of the taffrail.

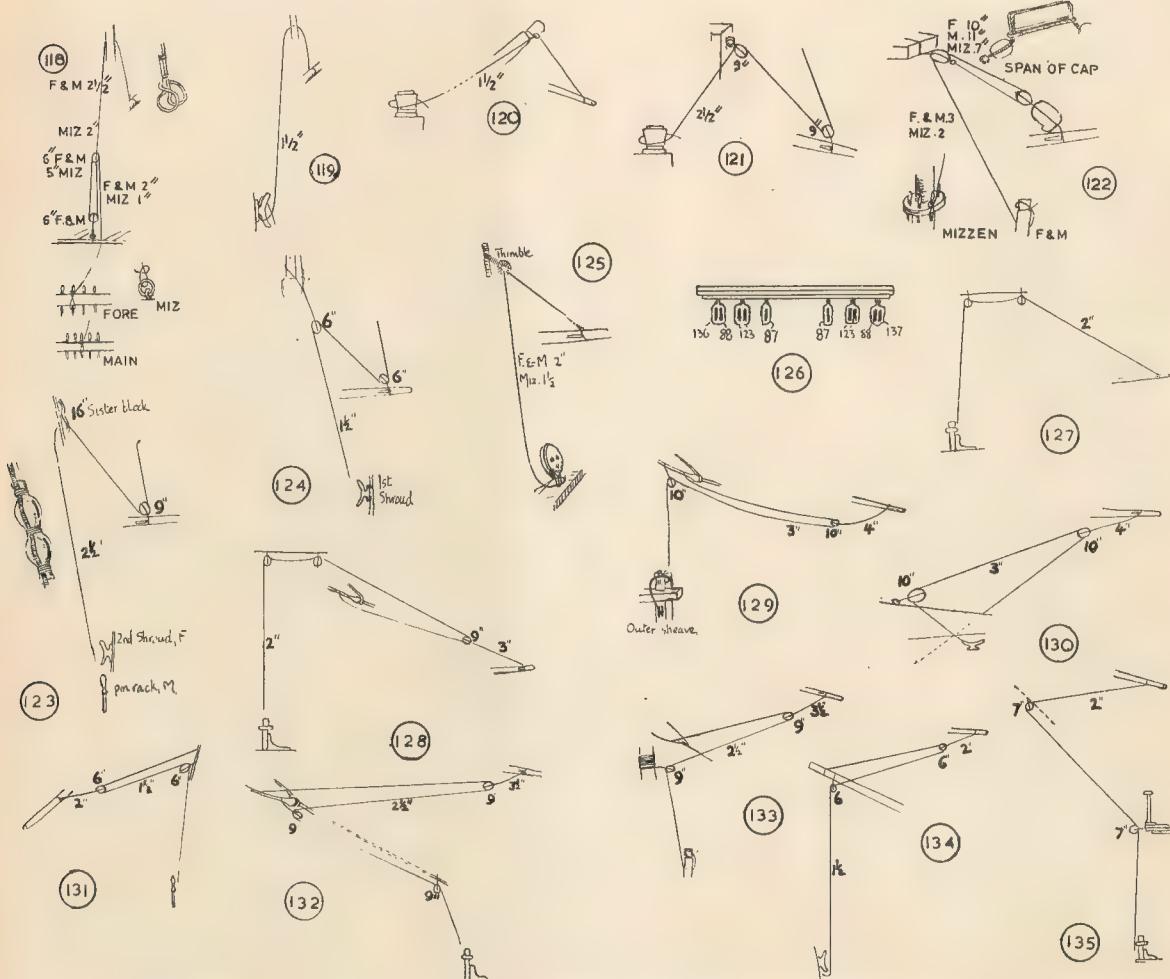
The rigging for the driver yards starts with the gaff throat halliard (Fig. 138). A single 9 in. block is strapped to the eye at the throat of the gaff and a 10 in. double block is suspended from the masthead to hang clear of the top.

Starting at the single block the  $2\frac{1}{2}$  in. halliard passes up to the double, down to the single and again to the double and leads down to a 9 in. block strapped to a ring bolt in the deck on the starboard side and belays to a deck cleat aft of it.

The gaff peak halliard (Fig. 139), a 1 in. rope, starts at the peak of the gaff, goes forward to reeve through a sheave in a 9 in. double block stroped to an eye bolt on the after side of the mizen cap. Then it goes aft to a 5 in. single block lashed to the gaff about halfway up, forward to the double block again and down to a similar belaying point as the throat halliard but on the port side.

The vang pendants (Fig. 140) also start from the peak of the gaff. There are two—one either side—held to the peak by a cut splice. The pendants are about 20 ft long and end in an 8 in. single block. The standing end of the falls start at this upper block

An 8 in. block attached to the inner eye bolt at the top of the taffrail is joined by the falls to the pendant block, belaying at the inmost cleat inside the taffrail. Both the pendants and the falls are 2 in.



The boom topping lifts (Fig. 141) run as a double  $3\frac{1}{2}$  in. rope from the end of the boom up to a 12 in. double block lashed halfway up the mast-head. From there they divide to port and starboard, coming down about halfway where they end in an 8 in. double block. An 8 in. single block with a 10 ft pendant is hooked to the eye bolt in the forward end of the mizen channel. The two blocks are joined by a 2 in. fall which belays to the after pair of pins in the mast pin rack.

There are three guy pendants (Fig. 142), each of  $2\frac{1}{2}$  in. with runners of 2 in. The first pair, for port and starboard, start at the outer end of the boom with a 10 ft pendant and an 8 in. double block; this is connected with its standing end to an 8 in. single on the outer eye bolt of the quarter and belays inside to one of the (already occupied) cleats.

The third guy is from the boom level with the taffrail and is much shorter, with 9 in. single blocks. The standing end of the runners are attached by an eye bolt to the starboard side of the rudder housing, with the belaying cleat over the centre of it.

#### RIGGING RELATED TO THE SAILS

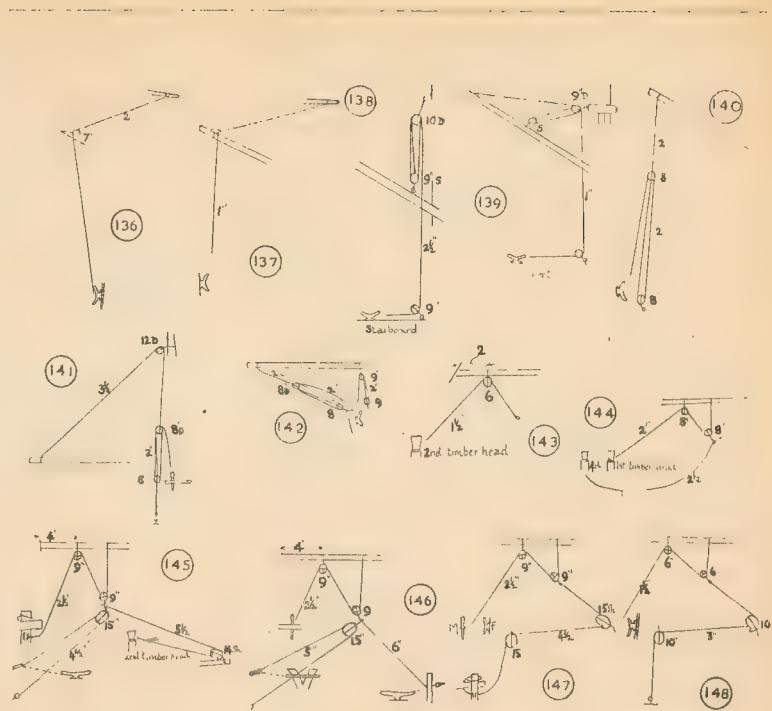
I move now to the bow and start with the sprit top clews (Fig. 143). A 6 in. block is stropped to the yard "two feet without the slings." A 1 $\frac{1}{2}$  in. line is bent to the end of the sprit yard lifts (I should make this about halfway between the yards), and passes up through the block and then straight back to the second timber head of the fo'c'sle.

The sprit yard clew (Fig. 144) has an 8 in. clew block on the yard 3 ft from the slings. The standing end of a 2 in. line is made fast to the yard a further 2 ft out, then it runs back to an 8 in. clew block—whose longish strap is engaged with the sheet—up to the block on the yard and finally back to the first timber head on the fo'c'sle. The sheet of  $2\frac{1}{2}$  in. is connected to the strap of the lower clew block (as already mentioned) and runs back to the ship to be belayed to the fourth timber head.

#### The fore clews

A 9 in. clew block (Fig. 145) is on a yard 4 ft from the slings with the standing end of a  $2\frac{1}{2}$  in. line a further 2 ft out. From there go down to another 9 in. clew block which is connected to both the sheet and tack, up through the block on the yard and down via the lubber hole through the outer sheave of the fore-sheet bitts to belay around the head of the bitts.

The 4 $\frac{1}{2}$  in. sheet starts at the ring bolt on the outside of the hull amidships, runs up to a 15 in. block whose



strop is engaged with that of the clew garnet, then back to the upper sheave of the "lead in" near the standing end, belaying around the large cleat between ports five and six. The tack is 5 $\frac{1}{2}$  in. and has a large crown knot, also engaged with the clew garnet, and from there runs down and forward to a 14 in. shoulder block at the end of the boomkin and back to belay at the second timber head. (The lower clews are called the clew'garnets.)

The main clew garnets (Fig. 146) are similar in run and size, but belay to the central pins on the crosspiece of the main-sheet bitts. The main sheet is 5 in. and starts at the upper ring bolt on the hull near the last gun port; the upper block is 15 in. and the sheet goes back through the lead-in just aft of the swivel gun timber and belays to the staghorn on the quarter deck. The 6 in. tack passes down through the sheave in the chess run and in through the lead-in by its side to belay on the forward cleat.

The fore top clews (Fig. 147) have the same general run with the yard blocks 3 ft from the slings and the standing end 2 ft further out. The line is 2 $\frac{1}{2}$  in. for the fore and main and 1 $\frac{1}{2}$  in. for the mizen, blocks 9 in. and 6 in. The fore clew belays at the cleat on the third fore shroud. The main

is at the second pin of the forward pin rack and the mizen at the cleat on the third mizen shroud.

The fore sheet is 4 $\frac{1}{2}$  in., starts at the topsail clew, goes through the 15 in. shoulder block at the yard arm, along the after side of the yard to the 15 in. block near the slings and down to the inner sheave of the sheet bitts.

The main is similar with the same size ropes and blocks belaying to the bitts via the inner sheave on the main sheet bitts. The mizen (Fig. 148) also with a similar run, but with 3 in. line and 10 in. blocks, belaying to the outer ring bolts abaft the mizen mast.

To be continued

#### FITTING BEARINGS

Plain, ball and roller bearings are described fully in *Bearings and How to Fit Them* by Ian Bradley and Norman Hallows.

The authors give details of the best materials and methods for constructing bearings, and describe their various applications, particularly with regard to the small workshop.

The book is obtainable from Percival Marshall and Co. Ltd, 19-20 Noel Street, W1, price 3s. 9d. post paid (USA and Canada \$1.00).

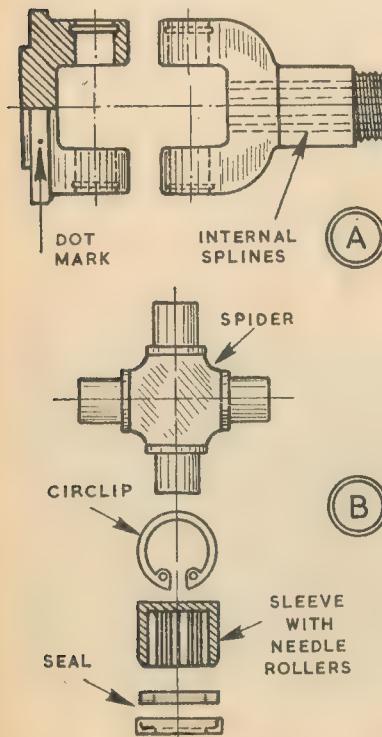
IN commercial use there is perhaps no universal joint better known and more widely applied than the Hardy Spicer type. The normal car employs two—one at each end of the propeller shaft—while a vehicle with de Dion or independent rear suspension requires four, two for each rear wheel driving shaft.

The joint is also often used on racing cars or specials for transmitting motion from the steering wheel to the steering box through shafts disposed at angles to clear the engine—where it is impossible to use a simple straight shaft or column.

Essentially, a Hardy Spicer joint consists of two forks, as at *A*, engaging with a cross or spider, as at *B*, via sleeves and needle roller bearings—a simple enough arrangement in principle, but with the details very well contrived.

The forks are not subject to wear and are not hardened. Each has two bores in line; and near the outer end of each bore is a circlip groove. The spider is hardened and accurately ground on its four journal surfaces. The sleeve bearings have blank ends and, like the needle rollers, are hardened.

In assembly, the large bores in the forks permit the spider to be entered



## BEGINNER'S WORKSHOP

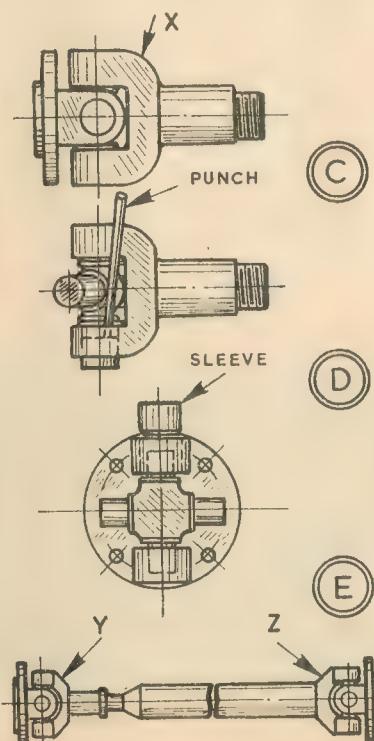
# Hardy Spicer Joints

By GEOMETER

at an angle; then the sleeves with needle rollers can be fitted in the forks from the outside, tapped down just beyond the circlip grooves and held in place by fitting circlips.

The sleeves having blank ends, the lubricant cannot be flung out by centrifugal force; while a cork seal in a steel retainer on each journal of the spider closes the open end. On renewal, a boxed kit of parts is available, consisting of the spider with seals, four sleeve bearings with needle rollers, and four circlips.

On a propeller shaft the universal joints can be checked by hand for lift and rotational play in themselves—ignoring, for this purpose, the play in the differential. Wear in the joints can result in a "clonk" as the drive



is taken up, a rattle when the drive is over-running, or a periodic vibration when the shaft runs off-centre and wobbles.

In conjunction with a faulty clutch, worn joints cause the propeller shaft to rattle and vibrate on starting.

For renewing the joints on a propeller shaft, it should be removed complete. This involves taking out eight bolts—four from each flange each end—the flanges having been dot-marked for re-assembly, as at *A*. The sliding part of the shaft with internal splines can be detached by unscrewing a ring nut.

Paint and dirt on the joints should be scraped from the open ends of the bores, and the four circlips removed, using small round-nosed pliers. This is followed by a further clearing of odd specks of paint and dirt, since the well-fitting sleeve bearings will not pass over such obstructions. Note should be made of the fitting of any greasers in the spiders, so there should be no mistake in assembly.

To dismantle, a fork can be tapped with a copper or lead hammer, as at *C*, point *X*. This drives the fork down and the sleeve bearing emerges. Alternatively, or additionally, a thin punch and hammer can be used on the open end of the sleeve, supporting the fork on a block or piece of tubing. Then, when the sleeves are about half out, they can be gripped with enclosing-jaw pliers and twisted and removed.

To assemble, the sleeves with needle rollers are drawn from the spider, and this is placed within a fork. Light grease holds rollers for sleeves to be entered, as at *D*, and press-fitting with the vice is less liable to disturb them than tapping with a hammer. Either way, the sleeves must enter squarely and, meanwhile, the spider can be moved from side to side to check that the rollers are in place.

Circlips follow when the sleeves are home, and the process is repeated for the other fork. Assembly of the sliding part must bring the forks on the shaft in line, as at *E*, *Y-Z*. □

# THE LNWR JUBILEE COMPOUNDS

C. M. KEILLER holds forth on the subject of the Webb compounds and proffers some practical answers to their running problems

**A**s the leading express locomotive of the "Premier Line," Francis Webb's four-cylinder design naturally created a good deal of interest, especially as it was outwardly a complete break-away from the preceding three-cylinder type, and this interest and the many arguments concerning their merits and shortcomings have lasted long after the engines themselves were no more.

In its original form the design was obviously not satisfactory—although very little seems to have been recorded about the performances of either the simple or compound trial engines—but, as modified, the early work was so good that for a short period it seemed that at last the LNWR had an express locomotive that was going to be on top of its job.

Unfortunately this early promise was not fulfilled and as a class these machines were not able to deal satisfactorily with the greatly increasing traffic of the period; but it should be noted that the brilliantly successful Caledonian Dunalastair class appeared in the same year as the Jubilee and that MacIntosh found it desirable, even with such engines, to increase their size twice in the two succeeding years.

Webb also gave his machines a larger boiler after four years, but this did little to improve matters as their

need was the ability to run fast downhill, the primary cause of which was in the machinery not in lack of steam, so, whereas the Caledonian engines could run downhill quite easily at 80 m.p.h., the Jubilees had to be driven hard to reach 70 m.p.h.

This may not sound important, but in the one case the engine was running under easy steaming conditions downhill and could, if needed, use this time for boiler filling or the like, while in the other case it would not be possible to increase speed on the downhill run if such operations were required.

It must not be inferred from this that the Jubilees did not do a great deal of hard work; they did, and one is rather tempted to wonder just how, for instance, Stroudley's beautiful Gladstones would have stood up to LNWR requirements. Undoubtedly the traffic out of Euston or Kings Cross in those days called for vastly greater effort than anything on the more leisurely Southern lines.

These locomotives could almost certainly have been turned, with quite trifling alterations, into one of the very best high speed designs of the day, and that always kept my interest in them until I felt impelled to make a model of one of them incorporating my suggested alterations.

Of course, in a case like this a successful model does not necessarily mean that a similar full-size engine

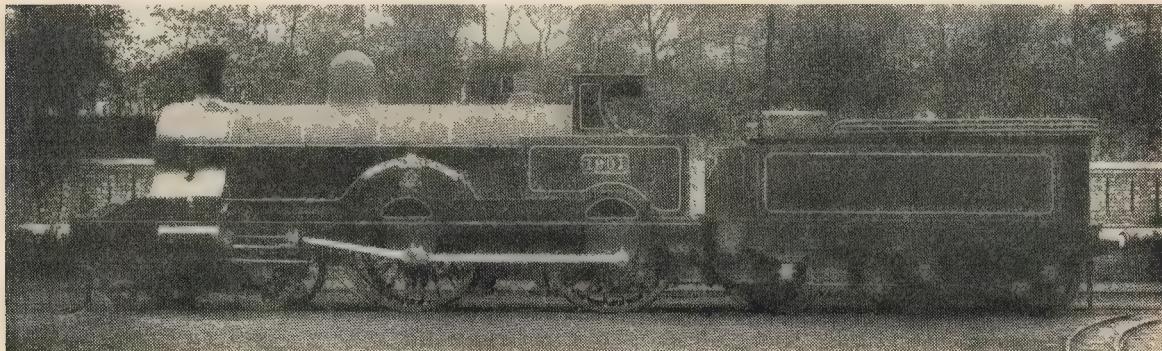
would be equally so, but I like to think it does give some indication. I would add that I do know something of what I am doing for I have already made two compound locomotives of the same scale, both of which give the results that were expected.

One is the LMS standard compound, arranged as on the big machine, except for the starting gear, which is a simple valve supplying boiler steam to the receiver. The cylinder ratio is 1 to 2.42, the gears interconnected, with the 1.p. cylinder, always having the earlier cut-off. This engine will run with perfect freedom right up to mid gear.

The other is the 4-6-0 freelance design. The cylinder ratio is 1 to 2, with derived gear, the 1.p. cut-off being later than the h.p. This engine also runs with great freedom, but it has long lap valves, large passages and the h.p. cylinder clearance volume is about 20 per cent. The LMS also has a more than usual h.p. cylinder clearance, as on the original in its final form.

Having decided to make the model Jubilee I wrote to the public relations officer of the London Midland Region for information. Photographs were easy to get but there were few drawings still in existence. However, these were sufficient and I am very grateful to the LMR authorities for their courtesy and for the trouble they took on my behalf.

The drawings I have are a sectional

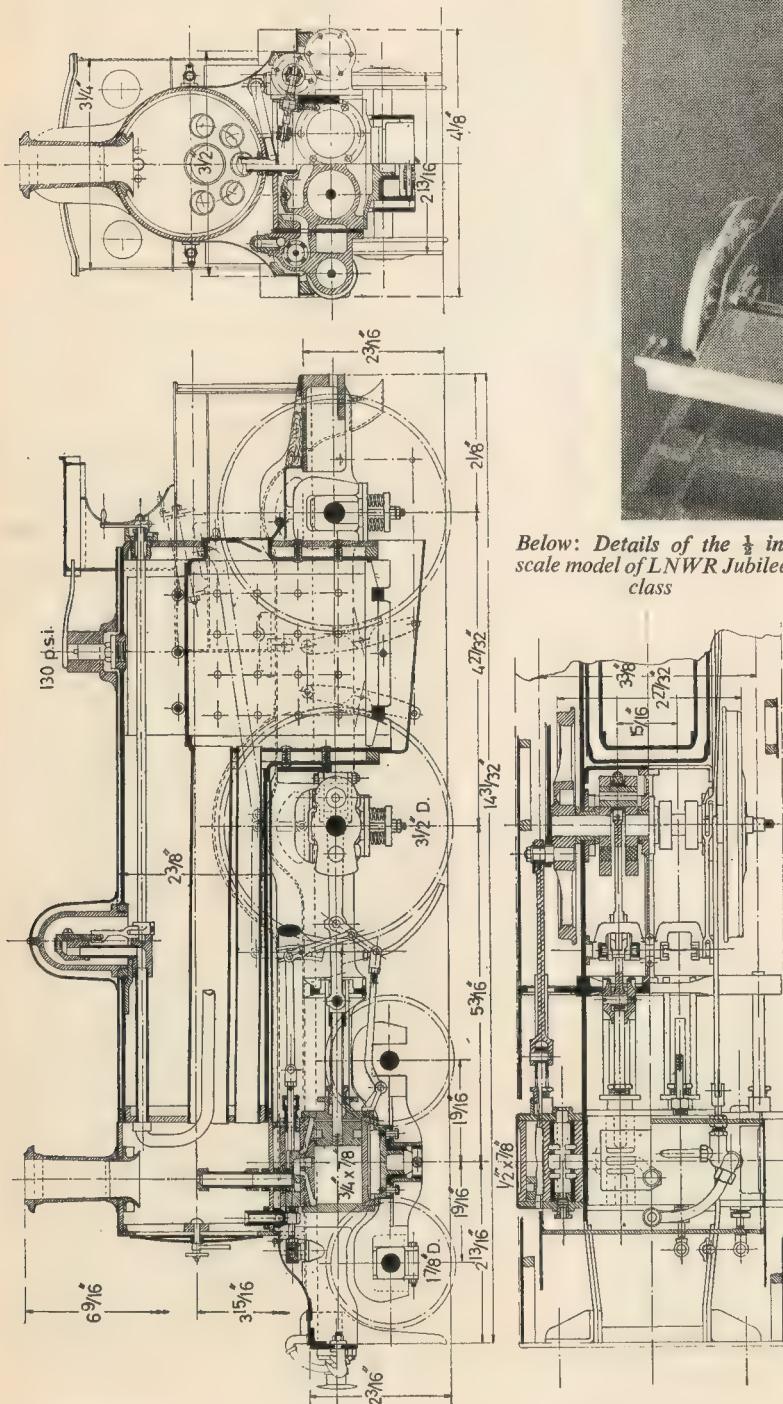


LNWR Jubilee class express engine built to Webb's design as a four-cylinder compound at Crewe, 1897

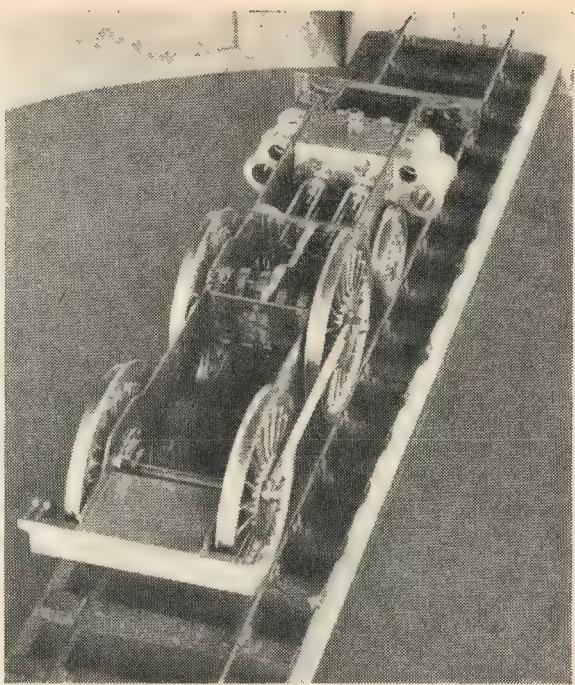
[British Railways]

elevation and plan of *Black Prince* with the double chimney and 19½ in. l.p. cylinders, and the front half of the same arrangement with the single chimney and 20½ in. cylinders. On both these drawings details of the

*Right: View of the chassis showing the machinery from above*



*Below: Details of the  $\frac{1}{8}$  in. scale model of LNWR Jubilee class*



I.p. valve is given and the alteration on the latter is most significant, especially in conjunction with the information I have of the valve gears of the three cylinder locomotives from Ahrons *British Steam Locomotives, 1825-1925*. Also, I have the very necessary cross-sectional diagram through the cylinders and driving axle.

At this point I would like to say that I was very much impressed with the very sound mechanical design of these engines, and in fact Whale used it almost as it was in his Precursors and related types, of course, without the h.p. cylinders and with the bigger boiler. The cylinders and motion were identical except for the longer stroke, and Whale provided a bit more space in the steam chest for the fore and aft movement of the steam.

The Webb engines had the two trailing hornblocks in one casting, making the rear end of the locomotive very rigid. I do not know if this was continued in the Whale design, but both designs had the rather narrow depth of frame between the coupled wheels which was certainly a source of weakness in both the Precursors and the George Vs.

When I got down to making my drawings, I found that there was quite a bit of designing to be done. I intended making the cylinder layout very much the same as on the big engine, but I found this would

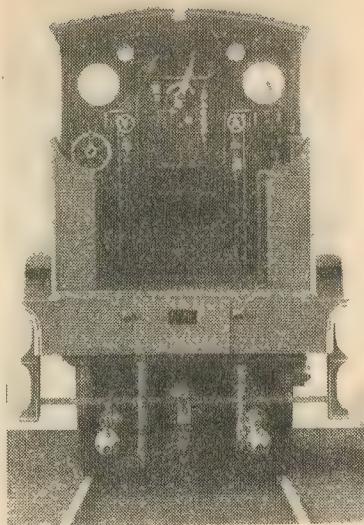
make it very difficult to make the pipe joints and also get an airtight smokebox.

However, after playing about a bit I arrived at a very satisfactory layout as the drawings show. The only entry into the smokebox is by the steam and blast pipes on the bottom centre line, and it is easily made airtight and easily disconnected so that the boiler can be lifted straight off. The original smokebox had to be airtight all over the top of the four cylinders.

The whole of the motion and cylinders (except the piping) is arranged exactly as on the original, and looks like it, but the requirements of the model necessitated a complete redesign as regards dimensions. To begin with, the scale stroke was quite out of the question for the outside cylinders unless one altered the bogie, and this I consider inadmissible. However, by using the narrowest piston I dare, with countersunk screws and no spigots on the covers, I could keep the outside length of the h.p. cylinders to scale with a  $\frac{1}{8}$  in. stroke.

The next step was to find the required cylinder sizes, and with a compound one has not so much latitude as with a simple. If they are too big one will be running with an early cut off and a partly closed regulator, with the l.p. engine doing very little work, but they must be large enough to give the maximum power that the adhesion will take when running straight compound.

My two existing compounds have just about the right cylinder power for respective sizes and I know exactly what I want in the new engine, which, of course, is smaller than either of these. I had intended to use 150 lb. pressure, as is my usual custom, but I found that for the power desired the cylinders would be smaller than I like using, more particularly in respect of the h.p., so I settled on



*Cab of BLACK PRINCE, the 4-4-0 four-cylinder compound locomotive [British Railways]*

130 p.s.i., with  $\frac{1}{2}$  in.  $\times \frac{7}{8}$  in. h.p. cylinders and  $\frac{3}{4}$  in.  $\times \frac{7}{8}$  in. l.p. cylinders, a ratio of 1 to  $2\frac{1}{4}$ .

The  $\frac{7}{8}$  in. stroke was used for the l.p. as I was going to make a built-up crank axle, and the similar strokes simplified matters. This did, of course, mean that the whole of the Joy gear had to be redesigned dimensionally, but there was nothing very difficult about this. It is in detail the same as the original, even to the type of rocking levers for the h.p. valves, except that on the large engines the h.p. travel is reduced as  $11\frac{1}{2}$  in. to 10 in., while on my engine the levers will be of equal length.

These Jubilees were provided with built-up self-balanced crank axles, one of the earliest examples of this type, and I was moved to make one

for the model with just force fits. Brazed-up axles are so completely out of character and the dimensions of this axle were very suitable for dispensing with the brazing.

The webs are made from ground flat stock, with silver steel pins and axles, and to drill the webs correctly a jig was made and fitted to the lathe face plate so that after drilling and reaming the centre hole, the crank-pin hole could be machined at  $\frac{7}{16}$  in. radius and then the web turned through 180 deg. and another hole machined exactly opposite this at the same radius.

This second hole was first used for lining up the webs when forcing on to the crank pins and afterwards for lining the finished axle up with the wheels as the crank-pin holes in the wheels were machined in the same jig. This second hole was  $7/32$  in. dia. and a close fitting silver steel rod was used for the lining up. The holes in the webs were finally filled with lead.

#### Wheel boss pockets

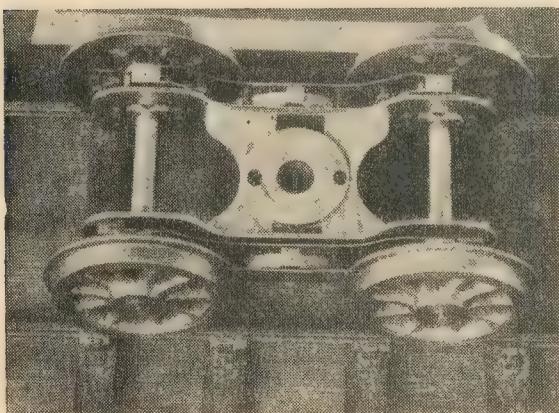
I would add that the balance webs are not large enough to supply the required weight, but the big engine had pockets cast in the wheel boss and these were filled with lead as required. My engine has  $\frac{1}{2}$  in. holes drilled in the boss and these are dealt with in the same way, those in the driving wheels being left empty and some of those in the trailing wheels being filled with lead.

The axle went together quite nicely and the side and centre journals only lost about two thou in truing up. I think next time I could get it together quite true. One of the chief difficulties is in getting a tight fitting pin to enter the web dead square. I think the pins were about  $1\frac{1}{2}$  thou tight, but it is not easy to be sure of the size of a hole this size. Finally, the pins were locked by  $3/32$  in. silver steel pins screwed axially into the joint between the pin and web.

The driving wheels of these engines had a large circular boss and all the wheels had the square faced spokes usual with Crewe practice, and, as I consider the appearance of the wheels in a model locomotive to be of paramount importance, I had to make patterns and get my own castings, which Stuart Turner did very nicely.

The Joy gear is quite normal and calls for no comment. A centre bearing is fitted to the crank axle, as it is such a feature of the Webb engines, although I must confess I fail to understand what purpose it serves. This, of course, necessitated that the centre axlebox must have a loose keep, so I decided to fit the other four driving boxes in the same way.

I was not sorry to do this as it



*The bogie truck of the model Jubilee*

enables the wheels to be permanently fixed to their axles. The keeps are hollow and have oiling pads in them. Another interesting feature of the original engine is the radial truck, and this has been copied exactly on the model. I again cannot see the reason for the curved slides as there is the usual turning movement round the centre pin, but it works very well and was used at Crewe for many years after Webb's time, and was also used by Sir Vincent Raven on the NER.

The spring control was of quite an advanced type giving a definite centring load with a single spring. I have always thought that any side spring control on the bogie of a small model would tend to derail the bogie wheels on a curve and had intended to fit only a token spring, but on trying out this spring—which had a centring load of six ounces—on the track with just the wheeled chassis, I found that it seemed to help. One noticeable effect was that both bogie flanges were pushed on to the outside rail instead of just the leading one.

The centring load is now ten ounces and there is no tendency to derail even without anything like the normal vertical load.

The curved guide and block are machined, but as the radius was too

large to swing in my lathe they were mounted on a bar outside the diameter of the face plate and slotted by hand rocking the spindle.

The details of the machinery will follow very closely that of the original. The 1.p. crossheads have four slide bars and the connecting rod will have a true Webb big-end. The h.p. cylinders will have two bar crossheads but their connecting rods offer some difficulty. The big-end is easy to copy but it will probably have a solid brass; the small end, however, is forked and strapped and while this is not impossible to make, it could not be erected or taken down without removing the foot-plate, so a compromise will be made by still keeping the fork but by having the pin running through the crosshead.

I have not yet decided upon the lubricator; it must be out of sight and there is not much room but I think it may be a displacement type in the cab.

I shall probably find room for one injector under the foot-plate and as the big engine had an air pump driven from the right-hand 1.p. crosshead, and as there is room to fit a water pump there, I shall do this.

The starting valve will be as on my LMS compound, a spring-closed needle valve on the steam pipe diverting boiler steam to the 1.p. steam

chest. This valve will be incorporated with the steam-pipe union on the left-hand h.p. cylinder and the operating lever will be just below the reversing wheel.

The outside dimensions of the boiler are a very close copy of the original and are, of course, rather on the small side, but it will be quite capable of doing its job; it is very normal in design and, of course, there will be no soft solder in its make up.

The drawings of the model are not meant to be complete working drawings but they show the chief points of interest and are helped by the photographs of what has already been made. Those of the big engine are taken from the official Crewe drawings and are arranged specially to show how closely the model adheres to the correct scale sizes, even though it is  $\frac{1}{2}$  in. scale for a  $2\frac{1}{2}$  in. gauge.

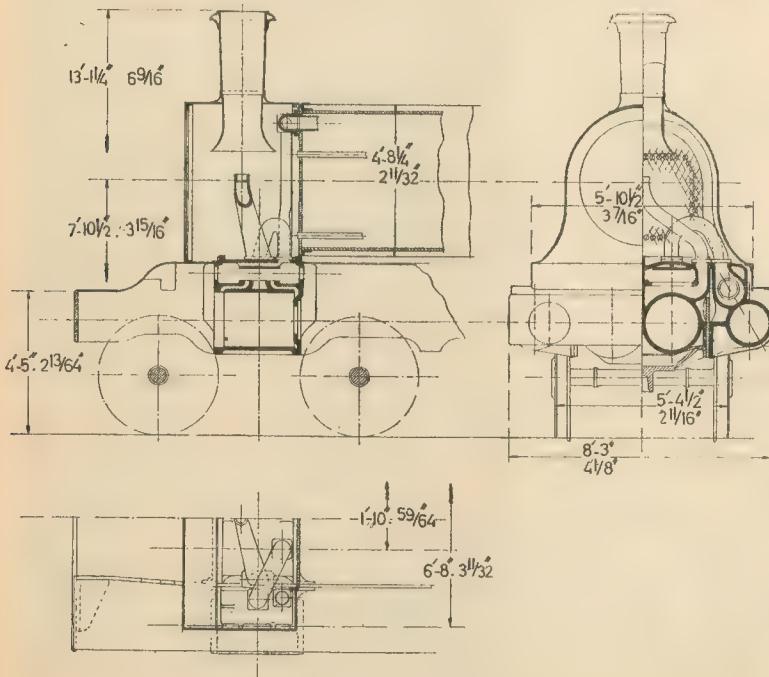
#### Wrong deductions

Looking back with our present knowledge of compounds, it is obvious that Webb made almost all the wrong deductions from his experiments and did not seem to understand what was going on inside the cylinders. But the easy answer is just not the answer. Webb was a very capable and clever engineer, well on top of his job and, moreover, all his simple engines were good, many of them outstandingly good.

The extraordinary thing is that his judgment seemed to let him down when he was dealing with his pet hobby. One would have thought that if he was in any doubt as to what was going on in the cylinders, a few indicator diagrams would have shown him at once. Perhaps this is the clue because so far I have been unable to find any evidence that any indicator diagrams of the compounds were taken.

Of course, we know that he was a difficult man to advise and I have seen it suggested that if he had listened to his drivers he might have anticipated Chapelon, but I am afraid this is just nonsense. George Whale, his successor, who, I believe, had been in charge of the running department during the time of the compounds development, promptly did the wrong thing when he became chief at Crewe and cluttered up these unfortunate machines with two extra unnecessary sets of valve gear. They did improve their running but at the same time also greatly increased their complication and cost of maintenance and were in no sense the cure, which was very much more simple and easy to apply.

There seems to have been an awful lack of clear thinking, which even



*This diagram was taken from the official Crewe drawings of 1897*

extends to the present day, as I read only a year or two back that the 20½ in. l.p. cylinders could not be increased in diameter because of the presence of the centre bearing on the crank axle. Webb had fixed the l.p. cylinder centres at 1 ft 10 in. apart in order to get 9 in. main journals, and this alone limited the l.p. cylinder diameter. Apart from this I doubt very much that the l.p. cylinders were too small, after all the Jubilee boiler was quite small, and in comparison with other compounds of their day, it would seem to be just about right.

The Teutonics and Dreadnoughts had the same boiler, and in the case of the former the one 30 in. cylinder with the lower boiler pressure of 175 lb. compares very nearly with the two 20½ in. cylinders and 200 lb. pressure. The Dreadnoughts, however, with 6 ft wheels, I would venture to say, were rather over-cylindered for express speeds. It was undoubtedly

the overlarge h.p. cylinders that were at fault; these should have 12½ in. dia. and then the Jubilees would have been lovely machines.

The first sample of the three-cylinder type *Experiment* was obviously meant to be a compound version of the Precedents. It had the same boiler and was generally the same size—cylinder sizes, ratios, and independent valve gears were all according to the book—yet it was a dead failure not only in weakness of starting, which was inherent in the layout, but in the running, which was completely dead in every way.

Now what was the reason? It is really simple: the absurdly small l.p. steam ports. This answer would have been quite obvious if the design had been checked up from first principles. The Precedents had 14 in. × 1½ in. steam ports for 17 in. × 24 in. cylinders, 1/10 of the piston area. This unfortunate compound had only the same 14 in. × 1½ in. port for the

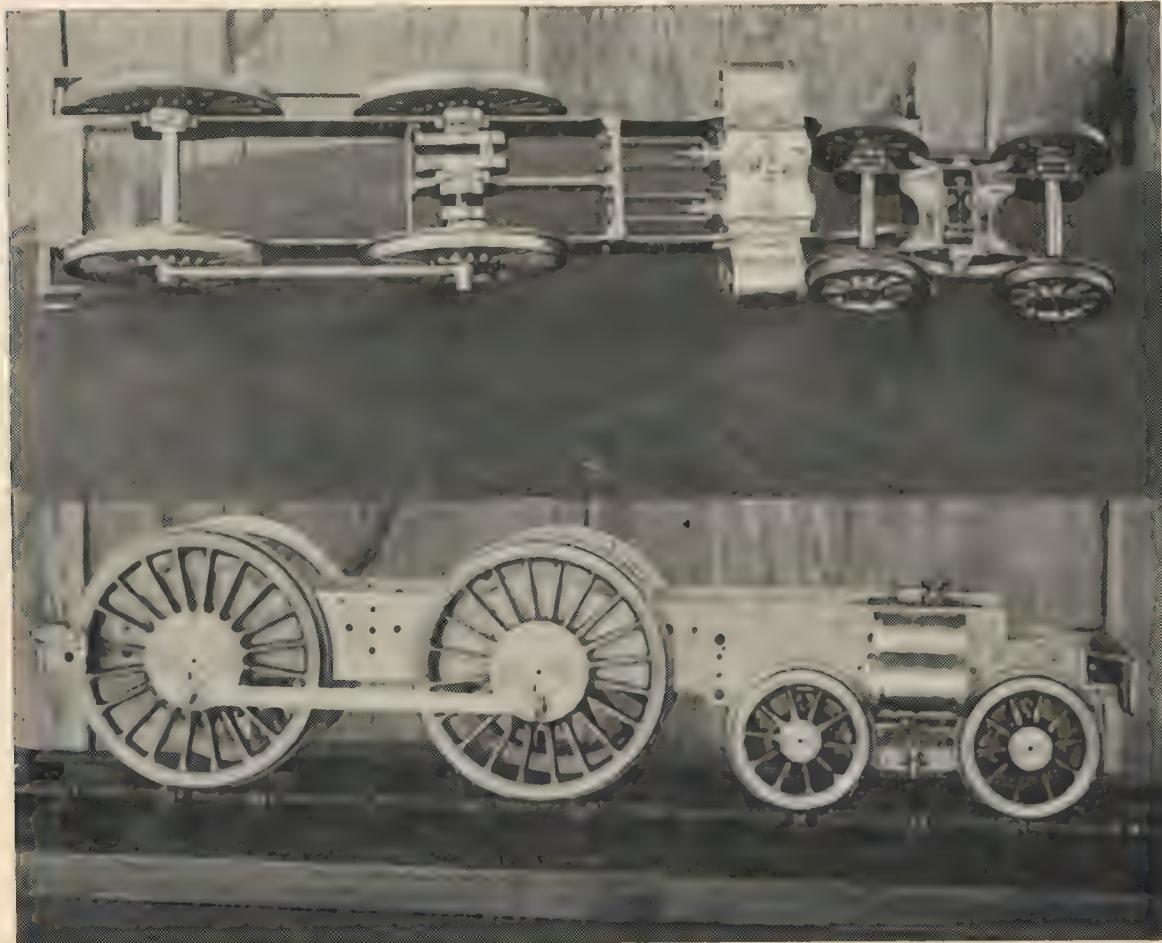
26 in. l.p. cylinder, 1/25 of the piston area. This was quite sufficient to account for all the shortcomings of this locomotive.

The next locomotive *Compound* had larger h.p. cylinders to improve the starting, reducing the cylinder ratio from 2.6 to 2, the 26 in. l.p. cylinder being retained with the port increased to 16 in. × 1½ in., a little better but not much, 1/17 of the piston area.

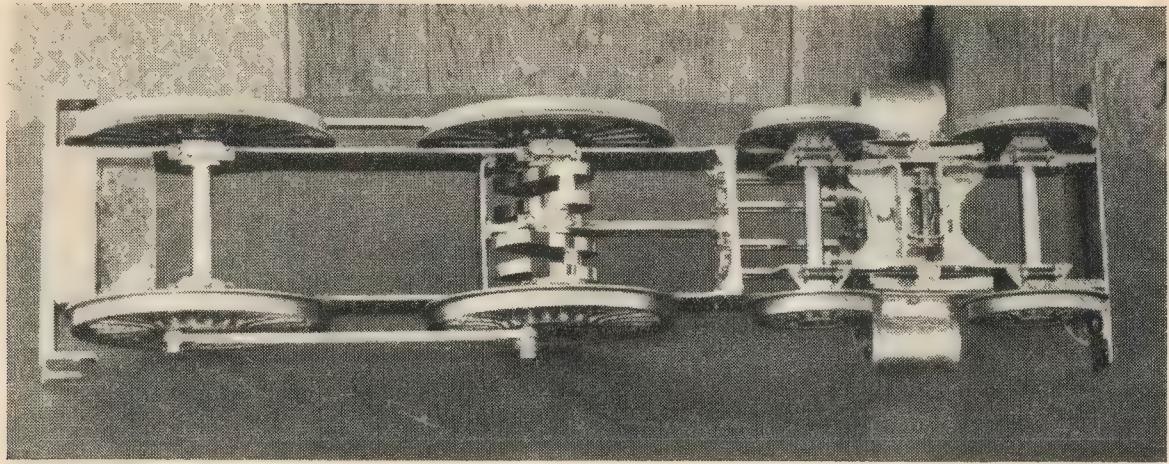
The next step was rather a counsel of desperation, a very much larger engine in every way with the cylinder ratio improved to 2.3, but the l.p. steam port area was relatively smaller; an 18 in. × 2 in. port for a 30 in. cylinder, 1/20 of the piston area.

This was the trouble; this was why the l.p. receiver got choked; why the l.p. could stand no notching up; and why there was so little power as soon as the speed began to rise.

Now see what happened with the next class, the 7 ft Teutonics. After



*Underneath view of model with bogie detached; and a side elevation of the completed chassis*



*Underneath view of model chassis with bogie in place*

the first two engines, the l.p. Joy gear was replaced by a slip eccentric giving a 1 in. longer travel, there was a  $1\frac{1}{2}$  in. port opening in place of  $1\frac{1}{4}$  in., as on the Dreadnoughts. These few engines of the Teutonic class had a brilliance of performance quite of their own, but the margin for this was small, as in the next two three-cylinder classes the reduction of the cylinder ratio from 2.3 to 2 removed the brilliance and, moreover, the price paid must have been fairly high in the Teutonics as, in spite of a  $\frac{1}{2}$  in. lead to the l.p. valve, they had to have an l.p. cut-off of 78 per cent to get this  $1\frac{1}{4}$  in. port opening; with their 2.3 ratio the l.p. cut-off should have been not later than 60 per cent.

In passing I would mention that LBSC's *Jeannie Deans* has an l.p. cut-off of about this figure.

Of course, these 30 in. cylinders should have had 30 in.  $\times$  2 in. steam ports or, better, two 15 in.  $\times$  2 in. ports in tandem with a double ported valve as is usual in marine practice, then we should have seen something. But the inherently unreliable starting would still have remained.

This brings us to the four-cylinder type where, by design or accident, the l.p. ports were very much improved. They were 15 in.  $\times$  2 in., 1/10 of the area of the  $20\frac{1}{2}$  in. pistons, relatively twice the size of those of the Teutonics, but whether it was thought that having now provided ample l.p. port area, and, therefore, liberties could be taken with cylinder ratio, one can never know, but they were at first given a ratio of only 1.7, and this with a derived gear for the h.p. engine.

Of course, a 1.7 ratio could be made to work reasonably well, but it would require the l.p. cut-off to be a lot

later than that of the h.p. at all points and this one cannot get with a derived gear; a little variation can be arranged but it is only a little.

As turned out with the  $19\frac{1}{2}$  in. l.p. cylinders the cut-offs were the same for both h.p. and l.p. and it was soon found that this set-up was not satisfactory and the ratio was increased to about 1.9, with the l.p. valve altered to make its cut-off 3 per cent later than the h.p.

In this condition these locomotives did do a lot of respectable work, and occasionally some very good, but they were seldom able to reach high speeds, and this is quite understandable as the 15 in. cylinders would be wanting cut-offs in the order of 30 per cent and it is quite obvious that the l.p. could not stand anything like this, as their volume at cut-off would then be a lot less than that of the h.p. cylinder.

Consequently high speeds would have to be attempted with cut-offs of not less than about 65 per cent with a much throttled regulator.

Now the admitted reason for the large h.p. cylinders was to get reliable starting, and if no starting gear is provided this is quite logical, but there is no reason at all why a four-cylinder compound should not have a starting gear, merely a valve to admit boiler steam to the receiver being sufficient. This has been, and still is, fitted to thousands of four-cylinder compounds and works perfectly.

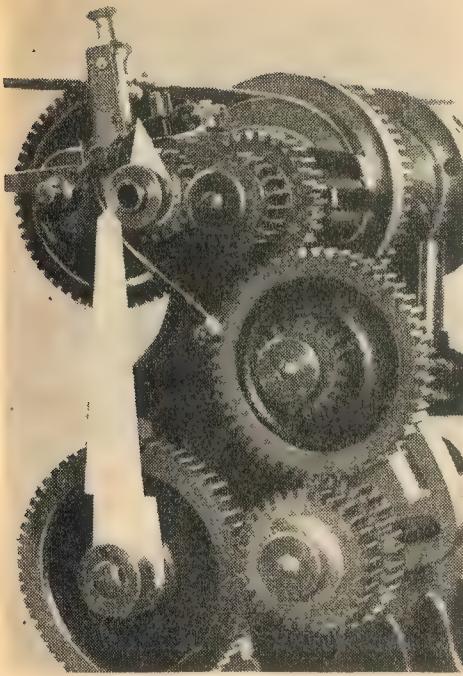
The h.p. cylinders could then have been reduced to give a ratio of about 2.6 when the equal cut-off of the derived gear would have been just right. The engine would have been quite free running and it would even have developed more power when pulling hard because the smaller

h.p. cylinder would require a later cut-off for the same rate of expansion and this would give larger port openings and later compressions, both of which are very desirable, in particular, the latter, as the compression pressure of the h.p. cylinder can easily rise to well above that of the boiler and cause great loss of power.

It would seem that the trouble the three-cylinder type had given, when boiler steam had got into the receiver at the wrong time, had so upset everyone at Crewe that they could not bring themselves to fit a starter to any sort of compound. It sounds silly, but there must have been something like this. Incidentally, I believe the four-cylinder compounds were quite reliable starters, and records show that at times the starting draw-bar pull considerably exceeded what was possible with the h.p. cylinders alone, thus showing that leakage past the h.p. valves and pistons did very effectively increase the starting effort in just the same way as the above mentioned starter would work.

Finally, I would say that the actual prototype of my model was the first engine with the  $20\frac{1}{2}$  in. cylinders and 200 lb. pressure and modified l.p. valve events. It was originally the four-cylinder simple of 1897 then numbered 1501; when converted to a compound later it was renumbered 1901.

I would like again to express my thanks to Mr J. W. Tonge, Public Relations Officer of the London Midland Region of the British Transport Commission and to the authorities at Crewe for the trouble they have taken on my behalf and for the permission to reproduce their drawings and photographs. □



Device for a simple thread pick-up described by John D. Elam

### A SIMPLE THREAD PICK-UP

MOST small lathes before 1940 had no means fitted for picking up screw threads. My lathe, a 3½ in. Drummond, was no exception.

I overcame this by scheming an electric flasher (seen in photograph, top left of mandrel) but I am not describing this, but an extremely simple and inexpensive device, which I had to hurriedly adopt because the batteries for the electric flasher ran out.

The threads to be cut were standard pipe threads  $\frac{1}{8}$  in.  $\times$  14 t.p.i., and  $\frac{1}{4}$  in.  $\times$  19 t.p.i., the lathe having a leadscrew of 8 t.p.i. It was necessary to take great care not to make an error in picking-up the thread.

As the photograph depicts, this was taken care of by cutting a strip of thin metal to form the long arm indicator, which is fixed to the lead-screw by whatever method the lathe adopts for its gearwheels. The small indicator on the mandrel is friction-held by gear securing nuts.

The procedure is as follows. Select gears for the thread and so arrange that the long arm is vertical with work to be cut in the chuck, or between

## Readers' hints

This is the feature where readers exchange workshop tit-bits gleaned from personal experience. Each idea published receives a Percival Marshall book voucher for 10s. 6d.

centres. Arrange the threading tool to be approximately  $\frac{1}{2}$  in. from the start and put in the clutch (or clasp nut) and secure the pointer on the mandrel to coincide with the long arm. See that the saddle, before each fresh cut, starts from its original starting position on the bed. Fix a stop to the lathe bed, if you have such, and if not place a piece of hardwood between the fixed tail-stock and the saddle.

Having decided on the depth of the first cut, you are now ready to proceed. When this is completed, withdraw the tool and run the saddle back to its starting point, put on the second cut, pull round the mandrel till the indicators are in line, and engage the clutch for second traverse.

If the lathe is power driven and you use the lowest speed with the back gear; you need not stop the lathe, but until one has gained confidence it may be as well to stop and start afresh each time.

I have found it so simple and fool-proof that I have not up to the moment troubled to renew batteries for the device.

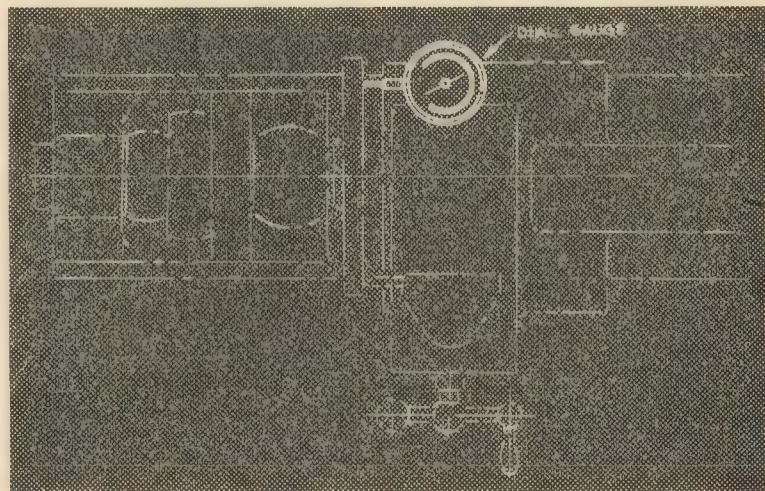
JOHN D. ELAM.

### CHECK YOUR LATHE SPINDLE THRUST

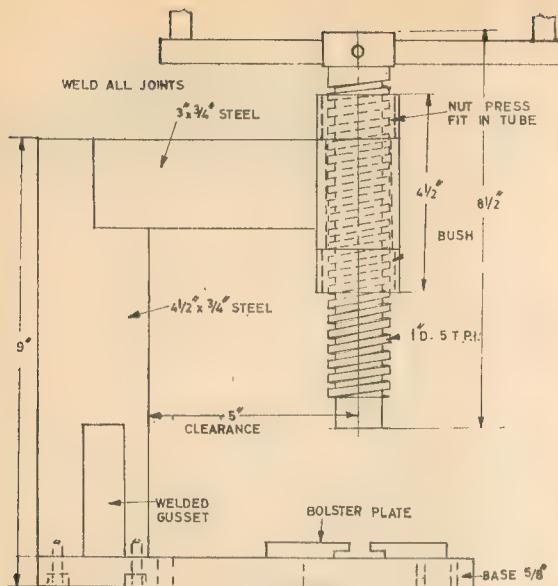
ALTHOUGH to outward appearances the thrust bearing of a lathe is doing its work correctly, there is a possibility that it is "wandering." Consider the attached diagram.

If the thrust faces are out of square, even to a very slight degree, a lateral movement will be given to the spindle.

The face plate may have been surfaced by a tool in the usual position



Details of the gauge for checking lathe spindle thrust



Details of P. J. Firmage's small fly press

and the substitution of a dial gauge for the tool point will, of course, show no relative movement. It is only when the gauge is moved across diametrically opposite that the error, if any, shows itself. This is a much more critical and certain test than trying to check on a centre point.

H. T. TROTMAN.

## A SMALL FLY PRESS

WHEN doing certain jobs, I find sometimes that I have not enough equipment, and have to roam the countryside to get a job done. This takes the joy out of it, so I thought of a way to get around this by building some equipment.

First was a small press. The bench vice is very handy, but it is awkward for many jobs which require pressure from above in a downward movement, i.e., pressing in bearings and bushes, a problem that model engineers come up against from time to time.

Fortunately, I live quite close to a place where I can get metal profile cut, so all I have to do is make a template of the size which I require, and then have it cut.

This saves a lot of time and hard work with the ordinary home workshop tool.

P. J. FIRMAGE.



Making use of an earth vice

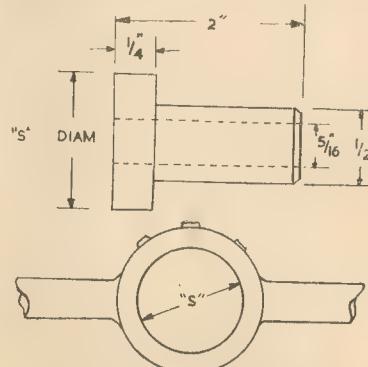
## DIE HOLDER LOCATING DEVICE

THIS is an idea which I have found very useful when cutting small threads on my 3 1/2 in. s.c. lathe.

External threads up to  $\frac{5}{16}$  in. dia. can be cut accurately by using the device shown in the sketch.

The dimensions given are for use in a  $\frac{1}{2}$  in. capstan drill chuck. For cutting larger threads it will be necessary to modify the shape to accommodate the larger diameter thread.

Secure the device in the tail-stock drill chuck, locate a ring-type die holder on diameter marked S. Position the lathe toolholder so that the



The die holder locating device designed by W. H. G. Blake

die holder handle rests against it thus preventing rotation of the die holder.

Feed the screw blank into the die by rotating the lathe by hand.

W. H. G. BLAKE.

## AN EARTH VICE

I HAD to dismantle an assembly held together by bolts, or the remains of them, rusted tight in their holes, which meant they had to be drilled out.

How to carry out the task was a puzzle, until I thought of putting the work into a pit, ramming earth round it, which was sufficient to hold it firmly, and then getting busy with brace and drills and soapy water, as in the photograph.

The rusty bits of metal were quickly drilled out, and the casting to which the assembly was bolted, dug up, now free from the plates, formerly fixed to it.

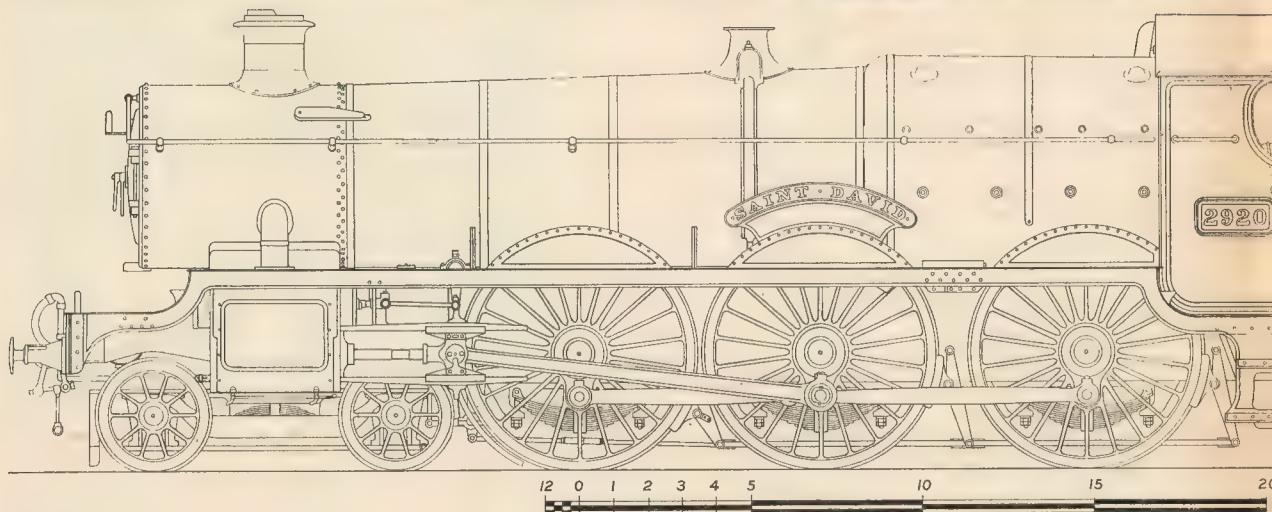
This method of taking awkward articles, digging a pit and ramming earth round them, will often enable them to be operated upon, when there is no vice large enough to hold them; or no vice at all, as in the case of some motor vehicle breakdown miles from a workshop.

Of course, if the object is small, it is not possible to ram it in a mass of earth in a pit, therefore, screw or clamp such an article to a heavy piece of wood and fix the wood in the earth (rammed firmly in position) and carry on.

H. H. NICHOLLS.

MODEL ENGINEER

# The Great Western Railway SAINT class



**I**N February 1902, while William Dean was still in charge of the locomotive department of the Great Western Railway, a large, two-cylinder 4-6-0 express passenger engine was put into traffic.

This engine, No 100, was a dramatic change from the hitherto normal trend of Swindon policy in locomotive design, and there can be no doubt that Dean's chief assistant, G. J. Churchward, was more than a little responsible for her.

She marked the beginning of that steady and persistent development that Churchward carried out during the following ten years, to culminate in the truly outstanding Courts of 1911-13. These Courts, of which there were 25, were actually a super-heated modification of the 20 even more celebrated Saints, built in August and September 1907, and of which more anon.

To go back to the beginning, for a moment, Dean retired at the end of 1902 and was succeeded by Churchward, who immediately began what amounted to a revolution in GWR locomotive policy. At that time, another large 4-6-0 engine, No 98, was already under construction; she was completed in March 1903, and while she was generally similar to No 100, she possessed some important modifications.

The boiler had a tapered barrel, whereas No 100's was cylindrical;

but probably the most important change was in the arrangement of cylinders and valve gear. For No 100, the cylinders were 18 in. dia. with a stroke of 30 in., and they had double-ported piston valves of  $6\frac{1}{2}$  in. dia., which was subsequently altered to 7 in. and later to  $7\frac{1}{2}$  in.; they were indirectly driven by Stephenson link motion, and the valve travel was, I believe, 5 in.

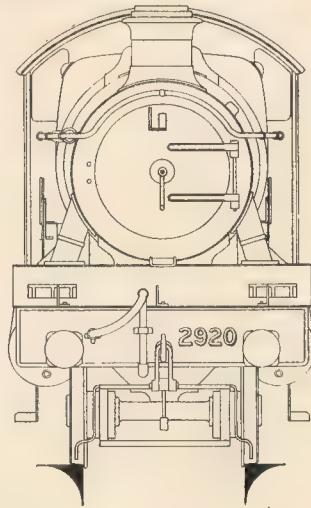
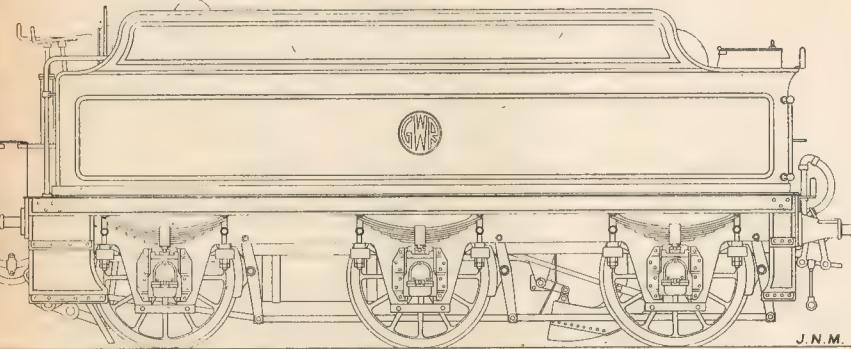
For No 98, however, the cylinders were altogether different; they were 18 in.  $\times$  30 in., as before, but they were each cast with half the smokebox saddle, and were bolted together as well as to the main frames which, at the front, were of bar type. The piston valves were of single-ported type and were no less than 10 in. dia.; they were directly driven by Stephenson link-motion, once more, but with launch-type links, and the travel was increased to  $5\frac{1}{2}$  in. The boiler pressure of both these engines was 200 p.s.i.

In December 1903, a third engine of this type was produced, similar to No 98, except that the boiler pressure was increased to 225 p.s.i., which remained the standard henceforth. This engine was the ever-popular favourite, No 171, *Albion*, and in October 1904, she was temporarily converted to the 4-4-2 type, so as to be tested as fairly as possible against the French compound 4-4-2, No 102, *La France*, which the GWR had purchased the previous year for special trials.

Between February and September 1905, a further 19 engines, Nos 172 to 190, were built, all generally similar to *Albion*, but 13 of them were temporarily given the 4-4-2 wheel arrangement while the other six were 4-6-0s. In May 1906, these were followed by ten 4-6-0s, Nos 2901-2910, subsequently named after various ladies of history, fiction and fact. No 2901 had cylinders  $18\frac{1}{2}$  in. dia., but in the rest the diameter was  $18\frac{3}{4}$  in.; in all, the valve travel was increased to  $6\frac{1}{4}$  in., which now became the standard for the whole class, excepting No 100.

In August and September 1907, came the 20 ever-memorable Saints, named after patron and other saints of history, and numbered 2911 to 2930. Finally, between October 1911 and April 1913, the Courts appeared, numbered 2931 to 2955 and named after famous English mansions and country houses in the home and western counties; they were simply superheated Saints.

The Saints and Courts marked the climax of Churchward's steady development of the two-cylinder 4-6-0, and they incorporated some further modifications of design. The cylinder diameter was now  $18\frac{1}{2}$  in.; the valve gear was operated by turn crank and screw instead of by the former large and heavy lever, while a pleasing change that very much enhanced the appearance of the engines was the introduction of the curved down-



drop between the higher and lower levels of the running-plates.

So successful and so popular did these last 45 engines become that, excepting No 100, the earlier engines all had their cylinders, valve gears and boilers brought into line with the later ones, so as to form one uniform class. This process was retarded by war conditions between 1914 and 1919, but it was completed by the end of 1922, and the entire class was superheated.

I had a great affection for the Saints; they were powerful and speedy, and No 2913, *Saint Andrew*, 44 years ago, when hauling a Birmingham-Paddington two-hour train of 11 corridor coaches, gave me my first experience of travelling at 90 m.p.h.

The 30 in. piston stroke, necessitating a 15 in. crank throw, fully visible throughout its rotation, irresistibly suggested high-stepping thoroughbred horses; it was most attractive to watch. These fine engines inspired the confidence of the men who had to work them, and I have never known a class that was more popular with drivers and firemen.

The dimensions were bold, original and, to not a few locomotive engineers, even terrifying; to enginemen, they were "just right; you know *exactly* what she will do"—as one driver once said to me. In those days, of course, the maintenance was also "just right," as it had to be, and coal was of tip-top quality.

Churchward had set himself the task of producing a high-speed express engine that would give a drawbar pull of two tons at 70 m.p.h., continuously, on level track; he achieved it in the Saints, by giving the greatest possible thought and care to the design and layout of cylinders, ports and valve gear.

His basic boiler design was already finally established, subsequent changes being of detail rather than of fundamental design; but the "machinery" was now, in the Saints, brought to its triumphant finality for the two-cylinder passenger and mixed-traffic engines, and it has remained unchanged ever since. Neither of Churchward's successors, Collett and Hawksworth, found any necessity for making any alterations, in later years. Some American features were deliberately introduced, as Churchward admitted, "to beat the Americans at their own game."

The heads of the 10 in. piston valves were placed over the ends of the cylinder bores, so that the steam passages for admission had practically no length. The steam lap was 1½ in., exhaust lap nil, and there was no exhaust clearance. A special feature was the short length of the eccentric rods, 3 ft 10 in., purposely planned to give a big variation of lead.

At 25 per cent cut-off, the lead was ½ in.; in mid-gear, it was ¾ in., and on this basis the full-gear lead was negative to the extent of about ¾ in.

(the official figure is — 0.15 in.).

The usual position of the reversing gear, when running, was notched up to between 20 and 25 per cent cut-off, and in these conditions there appeared to be no holding the engines; moreover, they were very economical in fuel consumption with loads up to 400 tons.

The bogie wheels were 3 ft 2 in. dia. and the coupled wheels 6 ft 8½ in. dia. Wheelbase was 27 ft 1 in., divided into 7 ft plus 5 ft 4 in. plus 7 ft plus 7 ft 9 in., and the overhangs were: front 2 ft 6 in., and back 6 ft 6 in.

The boiler was a Swindon Standard No 1 with a coned barrel 4 ft 10½ in. dia. at the front and 5 ft 6 in. at the back, pitched 8 ft 6 in. from rail level, the length being 14 ft 10 in. There were 176 tubes, 2 in. dia. and 14 superheater flues 5½ in. dia.; the elements were 1 in. dia. The heating surface of the tubes was 1,686.6 sq. ft, and of the firebox 262.62 sq. ft. The firebox casing was 5 ft 9 in. wide at the boiler centre line, and 9 ft long. The engine weight was 68 tons 6 cwt, of which 41 tons 18 cwt rested on the coupled wheels. The 3,000 gal. tender shown in the drawing weighed 43 tons 3 cwt in working order, making the total 111 tons 9 cwt.

The working pressure was 225 p.s.i., and the tractive effort at 85 per cent of the boiler pressure was 20,530 lb.

*Saint David* was the last survivor of this celebrated class and was withdrawn in September 1953. □

# LOBBY CHAT

By L.B.S.C.

This week LBSC has a friendly discourse on sundry matters concerning locomotives both large and small

**I**N Smoke Rings a month or so ago [ME, July 25] reference was made to a WR Castle class locomotive that had proved an exception to the general rule by refusing to behave in the manner usually observed among these grand engines—and nobody seemed to know why. *Berkeley Castle* was a shy steamer and a jibber in general.

That sort of thing appeals to me, and as I love trouble-shooting nothing would have pleased me better than to have run her for a spell, endeavouring to solve the problem. A locomotive will usually tell her driver what is amiss—just as plainly as if she had a tongue—and there were very few old-timers who didn't understand locomotive language.

However, it usually happens that one locomotive in a class will gain notoriety in some way or other, in a manner that is apparently inexplicable, and I know of quite a few cases. The explanation sometimes suddenly comes to light when least expected, and may prove both simple and amusing.

Here is a case in point, featuring one of the Stroudley D class 0-4-2 tank engines. There were 125 of these all told, and the way they worked the heavy suburban traffic and occasional main-line jobs such as excursions was just nobody's business.

On the LBSCR enginemen were encouraged to work their locomotives in the most economical way, one incentive being payment of coal money to all who used less than a specified allowance, which was 17 lb. per mile for the engine and  $1\frac{1}{2}$  lb. for every two axles in the train. Each engine had a regular driver and fireman, who looked after and took pride in her, and there was keen competition at each running shed as to who would be at the top of the coal-saving list each month.

The rate paid was a penny per cwt for all left over from the allowance, and most of the enginemen drew from 25 to 30 shillings per month, which was "real money" in those days, when twopence-halfpenny would pur-

chase, to use the vernacular, "a packet of fags and a pint of wallop."

One of the D class tanks (to the best of my recollection it was 235 *Broadwater*) put up an apparently amazing performance week in and week out by running on the engine allowance alone and apparently pulling the coaches without needing any additional firing.

Naturally, the driver and fireman were always at the top of the coal list and, in due course, this attracted the attention of the locomotive superintendent. The engine didn't appear to be any different from the rest, and the driver had not altered the valve setting nor made any other adjustment to improve performance; so when she went to Brighton Works for general overhaul (engines were not "run off their wheels" in those days) they pulled her to pieces in an effort to find out why she was so economical, but never a clue presented itself.

#### Experts baffled

After doing such reconditioning work as was needed, the bits and pieces were put together again in the same way as all the rest of the class, and the engine returned to service. She promptly repeated her "pull-the-train-on-nothing" antics, and as the driver and fireman didn't happen to be named Jock MacDougal and Ikey Goldstein, the powers that be were completely baffled. Incidentally, some of ma ain ancestry hail fra North o' the Borrerderr, ye ken, which is why LBSC-designed engines are verru frugal wi' the steam!

In due course the driver was promoted to main-line work and took over a tender engine at another depot. The new crew on the tank engine burnt the normal amount of coal, and at long last the secret was revealed and everybody had a good laugh. The driver had indulged in a perfectly legitimate piece of jerrywangling.

On the LBSCR the coal was always loaded straight from the wagons into tenders and bunkers by a small steam crane and 10-cwt skips. The coalies filled the skips in the wagons, and the crane then lifted each and swung it over the tender or bunker, and either

the fireman or one of the coalies then released the catch which dumped the bottom of the skip and deposited the contents on the engine.

With a number of engines requiring coal at the same time there was, naturally enough, no time to waste, and a few nuggets of coal were spilled during the operation. When there was a slack period the driver of the crane would drop a skip by the side of the coal road, and the coalies would sweep up as much as they could and fill the skip. They couldn't be as careful as a housemaid sweeping the parlour carpet and, consequently, the contents of the skip usually consisted of a mixture of black diamonds and ballast—and if any driver cared to take a "tub of muck," as it was nicknamed, it wasn't booked to him.

The driver of the tank engine took advantage of this, and tipped the coalies to save the muck for him, which explained how the milk got into the coconut, as the only coal booked to the engine was what was loaded on to her from the wagons. And that was all in order. Every "tub of muck" used meant fivepence each for driver and fireman.

#### Would go on granite!

There is just one serious point to note in this anecdote. I've often said in jest that my old veteran *Ayesha* would steam on a mixture of tarmac and granite chips, but the little LBSCR tank engine came very near to actually doing it and it speaks volumes both for the design of the engine and the way she was maintained and operated that she was able to do this and get away with it for so long a time.

I'll venture to assert that there isn't a single locomotive on the whole of British Railways today that could equal the feat or, indeed, anything like it.

Writing about coal reminds me of another thing that I fail to understand. One of the many excuses put forward for bad steam locomotive performance at the present time (and, incidentally, an argument in favour of their speedy replacement by diesels)

is that large coal cannot be obtained.

According to my experience this is no excuse at all. It is understandable in the daily press, but when put forward in both technical and semi-technical journals by writers who claim to know what they are writing about, it is frankly puzzling.

When a fireman on the LBSCR saw the tender or bunker full of big lumps, he usually added a few new words to the dictionary of railroad Esperanto before proceeding to "make little ones out of big ones," as it was phrased. All our engines steamed best when the coal was broken up into pieces about the size of oranges or potatoes, and spread over the firebars so that the fire was thicker around the sides of the firebox than in the middle, and only a thin fire was needed at that.

If we could have got the coal already broken into small pieces a lot of back-breaking work would have been saved. I can assure readers that it is no picnic dragging big lumps of coal from the back of the tender and breaking them up while on the run. Even when the engine was burning only 27 to 35 lb. per mile there was no time for rest.

I wonder if the folk who moan about the absence of big coal have ever taken account of the size of an average firing shovel or scoop, and the size of the average firehole door! Neither is any confirmation of the "big coal" fallacy. The stoker-fired engines in the USA and elsewhere break up the coal into smaller pieces than commonly used in hand firing.

#### Oldtimer identified

On page 103 of the July 18 issue there appears a photograph of an ancient four-wheel locomotive, and the owner Mr G. H. W. Randell wants to know if anyone can identify it.

Well, I have here at the present moment a catalogue issued in 1891 by the British Modelling and Electrical Company of Macclesfield, a firm which was formerly known as J. Sutcliffe. The engine is No 4 in the locomotive section of the catalogue, and the specification is as follows:

"No 4, Bright Brass Locomotive, similar to above but 7 in. long, cast polished frame, bright brass footplate, pair of oscillating cylinders, driving wheel 2½ in. dia., safety valve, steam whistle, water tap and steam tap, complete on massive brass wheels. A very handsome model, and strongly recommended. Price 12s. 6d."

The "above" mentioned in the specification is a similar but smaller engine, and is illustrated—so there is no mistaking the relationship. As a matter of fact the engine was a stock commercial article, sold retail by

practically every firm in the model trade.

I recollect seeing similar engines offered for sale at the same price at John Bateman's shop in Holborn and R. A. Lee's shop in Shaftesbury Avenue, as well as opticians and general dealers' stores, such as W. E. Archbutt's emporium in Westminster Bridge Road. I don't know who were the actual makers, but obviously all the firms selling the engines would not have made them exactly alike!

Mr Randell's engine has apparently had a collision at some period of its career, as the frame is bowed and the bunkerplate at the back is leaning over. I don't wonder at the safety valve not functioning—very few of them did!

The valve usually consisted of a little steeply-inclined cone in a similar hole in the top of the pillar, and the spindle and spring were inside. The spring was made from hard brass wire, and it would have required an enormous pressure to lift the valve at all.

Some of the old catalogue writers had vivid imagination. For instance No 10 engine in the BMEC list had oscillating cylinders and "massive" 3½ in. driving wheels and was "guaranteed to run at 10 miles per hour." Price 55 shillings. No 12, a slide-valve engine also with "massive" driving wheels 4 in. dia. was stated to be "capable of travelling at the rate of 14 miles per hour" (gee-whiz!—accent on the whiz) and that one cost £5 12s. 6d.

Both these locomotives had pot boilers fired by a three-wick spirit lamp with open flames. A 10-mile-an-hour breeze would have deflected the flames from the underside of the boiler and prevented it from steaming.

The various testimonials, obviously written by schoolboys ("I ran the engine every day during the holidays," etc., etc.), are both amusing and entertaining.

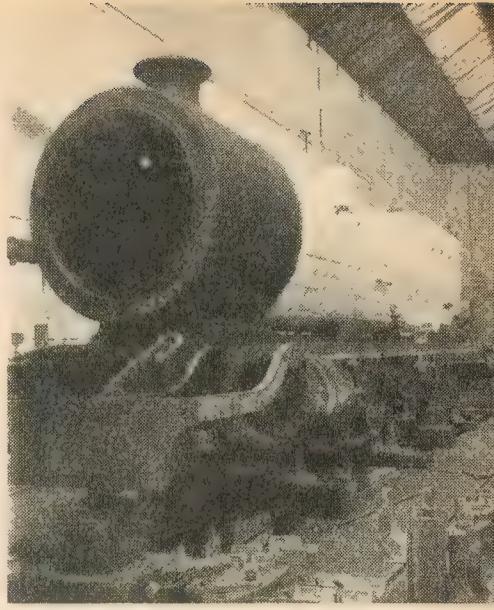
#### Safety-valve tip

Correspondents sometimes complain that the safety valves on their locomotives won't shut down tightly, but persistently dribble although the boiler pressure is lower than working pressure.

The seating may not be true, either with mitre or ball valves. With the latter the ball may be too small for the seating or the spring may not be truly squared off at each end, so that the cup is not bearing fairly on the ball but is pushing it to one side.

In the first case the remedy is obvious: the valve needs grinding in. But make certain that the depression in the valve is deep enough to allow the cone point of the spindle to bear in it *below* the level of the seating.

If a ball is too small for the seating



An LBSCR 4-6-4 tank engine being erected at Brighton shops

it goes down so far that steam pressure below blowing-off point will prevent it from completely closing. I have cured several of these cases by taking a slight scrape off the seating with a suitable D-bit, holding the valve body in a tapped bush and then very slightly opening the hole in the seating with a taper broach.

#### Showerbath for driver

A ball one or two sizes larger (according to the size of the valve) was then fitted, and a new cup and spindle made to suit. A fresh spring, with the ends squared off by touching them on the side of a fast-running emery wheel, completed the job, and the valve then shut down tightly at a few pounds below blowing-off pressure, lifting again at working pressure.

I have never had any trouble with pop safety valves failing to shut tightly. My only objection to these merchants is that the sudden release of steam when they pop off causes a miniature waterspout to form underneath them, and with a high water-level the driver gets a showerbath.

The same thing happens in full size, and that is one reason why pop safety valves were not fitted to the taper boiler barrels of the Great Western locomotives. That bit of information came "straight from the horse's mouth" many years ago.

The reader who was perturbed because he couldn't get full port openings on a 3½ in. gauge *Netta*

## Lobby chat . . .

although he had followed the instructions will be comforted to learn that the ports *were not intended to open fully*!

Maybe if I explain that apparent puzzle it will save other readers from getting false impressions. It used to amuse me very much when a certain designer used to ask in great glee what was the use of my specifying big ports when they never opened fully. The point that he overlooked was that there are two sides to a port—the steam side and the exhaust side—and it is the latter that is of vital importance.

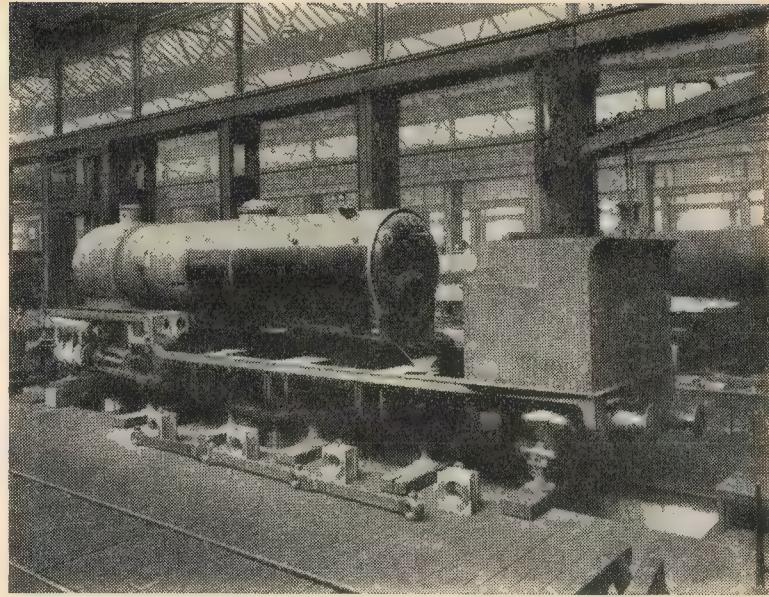
The late George J. Churchward, whose ability as a locomotive designer was second to none, said at an ILE meeting that "any fool could get steam into the cylinders, but it took a clever person to get it all out again." Truer words were never spoken. I realised that in full-size practice and in all the designs I have offered to readers of this journal in 33 years I have arranged the ports and valve gear to get rid of the exhaust steam and avoid back pressure. That is why the engines can run fast and pull big loads economically.

### Lengthen exhaust port

The way it is done is absurdly simple. I know, from my own experimenting, the size of port opening needed to get the steam into the cylinder in sufficient quantity and early enough to get full power on the piston the instant it passes dead centre. To get it out again by the end of the stroke and avoid back pressure, I simply lengthen the port on the exhaust side and arrange the cavity in the valve to suit.

The port, therefore, is not *fully* uncovered by the valve on the admission side, but *sufficiently* uncovered, which is a horse of another colour. On the exhaust side the extended port opens wide and releases the spent steam with a rush that produces what was soon known as the "LBSC chonk" among the builders of my earlier designs. The sharp deep-toned bark was very different from the feeble "chiss-chiss" which obtained with small ports and late release.

The sharp exhaust doesn't need a blast nozzle that causes back pressure by being too small. It is the *speed* of the steam from the nozzle—not the amount—that creates a draught through the firebox; and when that speed is obtained by letting the contents of the cylinder out by a big and rapid port opening, the boiler



*A Urie 4-8-0 tank engine being built at the LSWR works at Eastleigh*

will steam like a witch without excessive contraction of the blast nozzle, and the engine runs freely.

The 0-6-2 tank engine which I finished last May has a beat like pulling corks out of bottles when starting a big load in full gear. But on the run, with the lever just off middle, the blast is inaudible. Yet the small amount of steam that she is using shoots up the chimney at such a rate (owing to the free exhaust) that she will blow off sky-high if the firehole door is kept shut all the time.

The experimental 2-6-2 that I have just tested does exactly the same. Now you know all about it!

### How full-size engines are built

Interested beginners often ask if a full-size engine is made in the same manner as I describe for a small one. It is to a certain extent, but with the vast difference that one person, or even one gang, doesn't make the lot!

In a locomotive works such as Swindon, Crewe, Eastleigh and so on there is a foundry, boiler shop, machine shop and various other shops for cutting out frames, making fittings and all the various blobs and gadgets that constitute a locomotive's anatomy.

All the parts are taken to the erecting shop, and it is there that the engine takes shape, in much the same way as its baby sister in your own workshop. The frames are erected first and then the horns and axleboxes are fitted. Next come the cylinders and motion, but they don't have to wait for the

boiler until the chassis is finished as it is already made, and can be put on while the "works" are being attended to. When these are sufficiently far advanced the whole bag of tricks is lifted and the wheels run under it, and after it is lowered on to these the rest of the job is straightforward.

After the superstructure has been erected, the last bolt put in and the last pipe coupled up, the engine is steamed and given a trial on the road. If satisfactory she then goes to the paint shop; one final trial, and then out she goes on the road to earn her living. Such was the procedure on the LBSCR, where the lads of Brighton Works could turn out one engine every two weeks. □

### HISTORIC LOCO MODELS

*Locomotives Worth Modelling*, by F. C. Hambleton, gives descriptions of many famous engines of the pre-grouping period including: the old Midland No 1447; London and South Western No 591; London Chatham and Dover No 145; the famous Great Northern Number One; and the Manchester, Sheffield and Lincolnshire No 694.

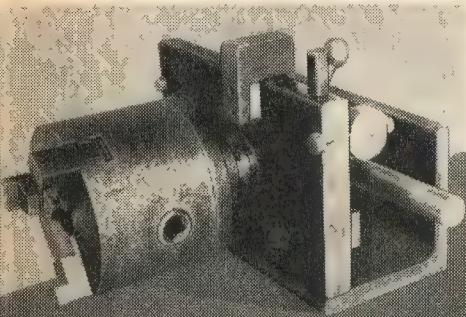
Lavishly illustrated throughout its 176 pages, with detailed drawings it is obtainable from Percival Marshall and Co. Ltd, 19-20 Noel Street, London, W1, price 10s. 6d., postage 8d. (USA and Canada \$2.50).

# A NOVEL DIVIDING HEAD

There's no dividing plate—and operation is very simple, asserts D. M. HUGHES, only two movements being necessary

THE head I am about to describe was constructed to take the normal Super-Adept chucks—that is, the spindle is threaded  $\frac{3}{8}$  in. BSF, but variations may be made to accommodate any fittings available.

The principle of the dividing head is novel in that it does not make use



Front view. Note fixed and moving stops

of a worm and worm-wheel. Imagine a wheel 360 in. in circumference. Each inch on the circumference will subtend 1 deg. of arc at the centre, i.e., if the wheel is turned through 1 deg. a point on the circumference will travel 1 in. If this wheel is fitted to a rack, a 1 in. movement of the rack will turn the wheel through 1 deg. But moving the rack back will return the wheel to its starting point, so some means must be found of disengaging the wheel and rack.

In this model this is carried out by means of a simple friction clutch. Of course, a wheel of 360 in. or approximately 10 ft dia. is not neces-

sary, as graduation is carried out very easily.

The body is in two parts—a  $4\frac{1}{8}$  in. length of 2 in.  $\times$  2 in.  $\times$   $\frac{1}{8}$  in. angle and a  $4\frac{1}{8}$  in. length of  $2\frac{1}{2}$  in.  $\times$   $\frac{3}{8}$  in. flat plate. These are fitted together by drilling and tapping the edge of the plate  $\frac{1}{16}$  in. Whit. to form a channel. The plate forms the front of the head. Centrally, and at  $1\frac{1}{2}$  in. from the bottom of the plate, drill a  $\frac{1}{8}$  in. clearing hole and carry on through the back plate.

Chuck a piece of  $\frac{1}{2}$  in. dia. brass  $\frac{1}{2}$  in. long, drill and ream  $\frac{1}{8}$  in. Assemble the body, pass a piece of  $\frac{1}{2}$  in. silver steel through and put on this bush. Braze the bush in position.

The shaft is turned from a piece of  $\frac{1}{2}$  in. dia. bright mild steel. Turn to the dimensions shown, thread  $\frac{3}{8}$  in. BSF and undercut the thread as shown. Leave the hole for the retaining pin until final assembly. Remove from the lathe and end-mill the slot  $\frac{1}{8}$  in. wide, right through the shaft and  $\frac{1}{8}$  in. long (see drawing).

My rack consists of a  $\frac{1}{8}$  in. BSF bolt. This engages nicely with the pinion available. It will be better if the pinion is obtained first, and a bolt found which will mesh with it.

The bolt,  $1\frac{1}{8}$  in. long, is drilled  $\frac{1}{8}$  in. for its full length. It slides on a piece of  $\frac{1}{2}$  in. dia. b.m.s. rod supported at each end, the supports being held on the back of the plate. The supports are  $\frac{1}{4}$  in. dia. and  $\frac{1}{16}$  in. thick.

The pinion used was of brass  $1\frac{3}{32}$  in. dia. with 50 teeth. Drill  $\frac{1}{8}$  in. and fit one face with a rubber washer  $\frac{7}{16}$  in. i.d. and  $\frac{1}{8}$  in. o.d. This forms one half of the clutch mechanism. The sliding sleeve is turned from a piece of  $\frac{1}{2}$  in. dia. brass. Turn as shown in the drawing, drill and

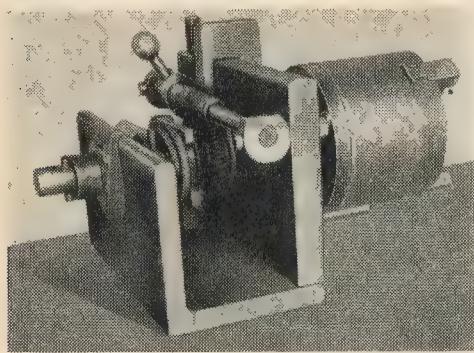
ream  $\frac{1}{8}$  in. and drill No 31 as shown. Cement a rubber washer  $\frac{7}{16}$  in. i.d. and  $\frac{1}{8}$  in. o.d. to the face of the sleeve. This forms the other half of the clutch gear.

The clutch lever and fork may be made from the solid or may be built up and brazed. File the arms of the fork to a sliding fit over the  $\frac{1}{8}$  in. dia. of the clutch sleeve. Drill and countersink the  $\frac{1}{8}$  in. upright  $\frac{1}{16}$  in. clearing. The bolster piece behind the upright is a brass block drilled  $\frac{1}{8}$  in. and sawn in half across the hole. After assembly of the whole head, fit this bolster to the front plate.

## ASSEMBLING THE HEAD

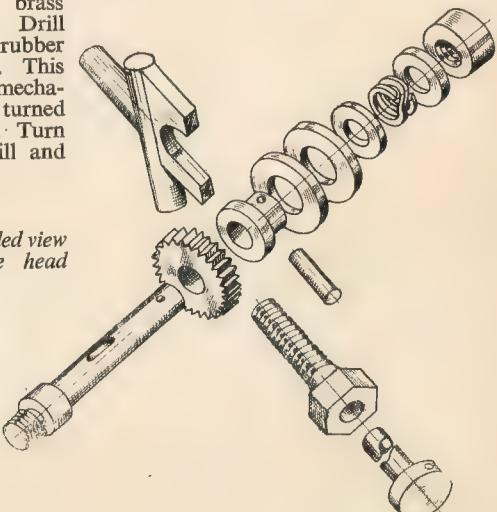
Take the front plate and insert the shaft. Put on the pinion with the washer away from the plate. Next, slide on the sleeve, followed by two suitable  $\frac{1}{8}$  in. washers. This is followed by a thin brass  $\frac{1}{8}$  in. washer, a short length of spring and another  $\frac{1}{8}$  in. washer. Now assemble the base and back, formed by the length of angle and screw to the front plate. Through the clutch sleeve and shaft drive a  $\frac{1}{8}$  in. pin. and ensure that the sleeve slides freely on the shaft.

Next fit the rack on its rod, filing the end support, so that the head of the bolt forming the rack fits against the front plate without any twist and that the bolt slides freely. Engage the rack and pinion and drill the



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Exploded view of the head



supports and shaft for a pin or screw. Pin to the front plate so that the rack and pinion engage and run freely.

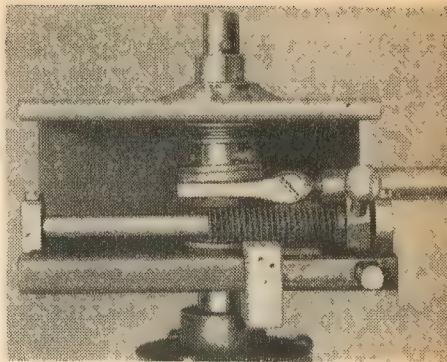
Now fit the clutch lever and fork. Engage the fork on the sleeve, with the two packing washers between the pin and the fork. Hold the fork and upright square, and mark through the upright to the bottom plate. Drill and tap  $\frac{1}{16}$  in. BSW. Assemble, using a  $\frac{3}{16}$  in. BSW countersunk screw. The bolster piece is fitted between the upright and the front plate. File to fit and attach to the front plate by a  $\frac{3}{16}$  in. BSW countersunk screw.

Finally, drill the shaft No 31 for a  $\frac{1}{8}$  in. pin, which will bear against the

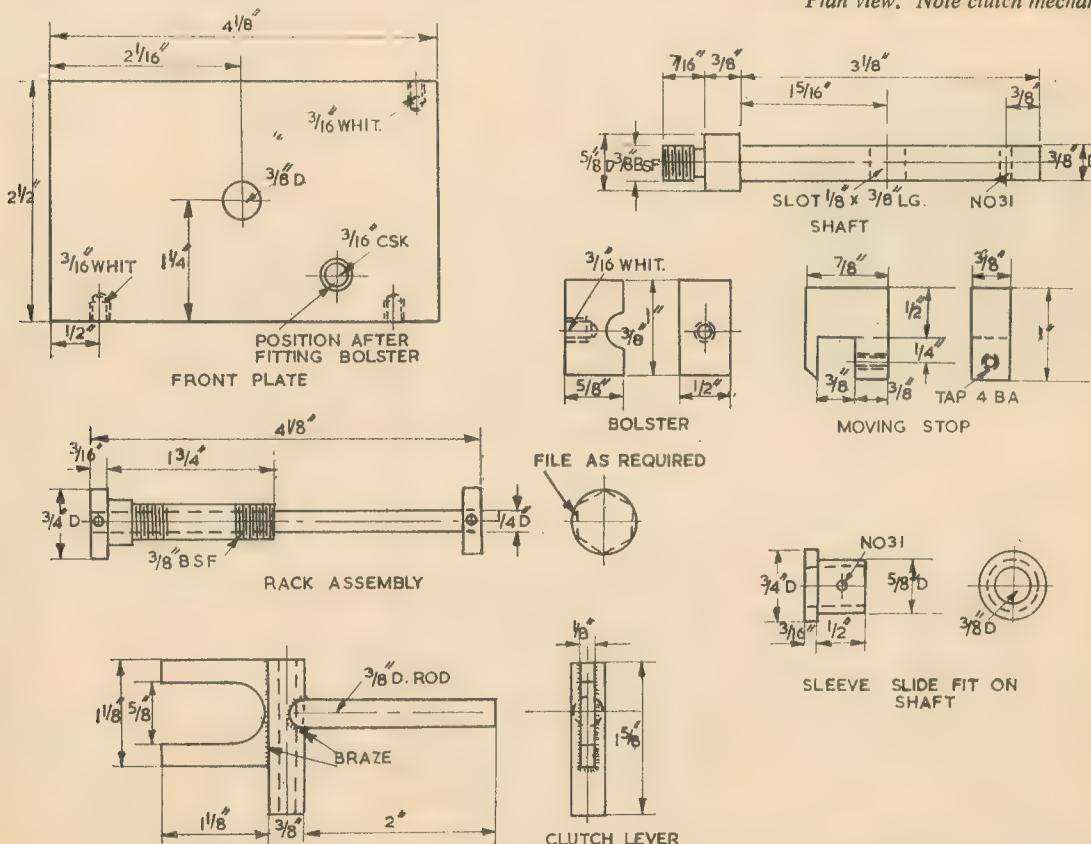
### GRADUATING THE HEAD

Using the chuck, face a piece of 1 in. dia. brass rod. Mark the centre and scribe a line right across, using a tool in the lathe tool post. Remove the chuck and brass complete from the lathe and fit to the dividing head, then set the point of a scribing block exactly at centre height.

Employing a square and flat surface, set the scribed line vertical and release the clutch and bring the rack right back to its starting point against the support. Let the clutch in and slowly move the rack along until the scribed line is exactly opposite the point of the scribe set to the side of the face



Plan view. Note clutch mechanism



rear bush and prevent any forward movement. To complete the head the stops are made. The fixed stop is a piece of  $\frac{1}{4}$  in. b.m.s.  $\frac{3}{16}$  in. long. Turn down and thread  $\frac{1}{16}$  in. BSW for  $\frac{1}{4}$  in. and screw into the top edge of the front plate  $\frac{3}{16}$  in. from the end.

The moving stop is a piece of 1 in.  $\times$   $\frac{7}{8}$  in.  $\times$   $\frac{1}{8}$  in. steel, slotted  $\frac{1}{8}$  in. to slide along the front plate. A 4 BA Allen screw is fitted in the front to secure it. The fixed stop has a flat filed along its length on the side farthest from the moving stop so that the faces are parallel.

of the brass rod. The chuck and brass rod have now moved through 90 deg.

Bring the moving stop back gently until it touches the head of the rack. Tighten the Allen screw. Now measure the distance between the outside faces of the stops (a). Deduct the distance between the outside faces of the stops when the rack is right back against the support (b). The difference is the actual movement of the rack (a-b).

This can be related to the movement of 90 deg., giving linear measurement per degree turn. Thus it is possible to

convert degrees into inches. When setting up for dividing, the measurement (b) is added to any movement required of the rack.

To operate the head set the rack movement as required, and clamp the moving stop. Mark the work, then slide the rack along slowly to the stop. Mark again, release the clutch and return the rack. Carry on as indicated until the work is completely marked.

No arrangement for holding down the head has been shown. This will be done as necessary by the user, who may use bolts positioned as required. □

**Do not forget the query coupon  
on the last page of this issue**

## READERS' QUERIES

This free advice service is open to all readers. Queries must be on subjects within the scope of this journal. The replies published are extracts from fuller replies sent through the post: queries must not be sent with any other communications: valuations of models, or advice on selling, cannot be given: stamped addressed envelope and query coupon with each query. Mark envelope "Query," Model Engineer, 19-20 Noel Street, London, W1.

### Insurance cover

I occasionally run a 3½ in. gauge model railway. Hitherto I have been insured for third party risk with the National Guild of Modellers. But when I last sent in my premium I was informed that they are now out of business.

I would be grateful if you can tell me of any other insurance company who issue this kind of policy.—R.H., Langley, Bucks.

▲ As far as is known there is no particular firm issuing policies to cover insurance for running a model railway. Any insurance company will do this in the same way that they issue policies covering third party risks to motorists.

### That cuppa

Am I right in assuming that the engineman's best friend is a cup of tea?—A.D.S., Cleveland Heights, Ohio.

▲ You are quite correct in your assumption. The engineman's best friend is a cup of tea—usually cold and without any milk.

### Naval plans

I would be grateful if you could supply the following information:

I The address of the Admiralty department concerned with plans, lines of ships, etc., including modern warships.

2 Any other addresses from which I might obtain plans of naval vessels—particularly of revenue cutters and similar types of smaller naval and semi-naval or privateer types from 1750 to 1850.—P.J.C., Stratford-on-Avon.

▲ It is difficult to get plans of ships from the Admiralty, and lines are practically impossible. However, you could write to the Admiralty, P Branch 1, Bath, Somerset. They supply a number of simple plans for WL models.

Then you could contact Norman A. Ough, 98 Charing Cross Road, London, WC2. He has produced a number of excellent plans of fairly recent naval vessels to ¼ in. scale, and would send you a list.

Finally, you could get plans of naval vessels large and small from 1750 to 1850 from the National Maritime

Museum, Greenwich. They have the original draughts and can supply copies at a reasonable charge.

### Phosphor bronze boiler

I have in my possession a phosphor bronze bush measuring 11 in. × 3½ in. i.d. × ½ in. thick. I take it this material would be suitable for a locomotive-type stationary boiler, and so would like to know the number of tubes and working pressure you would recommend.—A.G.G., Luton, Beds.

▲ Although the tensile strength of phosphor bronze is very considerably greater than that of copper it is a much less ductile metal and inclined to be brittle, especially after repeated heating and cooling. In addition, the intense heat required for brazing the joints of a boiler would tend to burn the phosphor out of the bronze and leave it porous.

A boiler of this size could be made with anything up to 10 to 12 fire tubes, ½ in. dia., passing longitudinally through the barrel, assuming that it follows locomotive practice with a water-surrounded firebox at one end and a smokebox at the other.

It is usually necessary to operate boilers of this type at pressures above 80-100 lb. and the boiler before being put into service should be hydraulically tested to not less than 50 per cent over working pressure.

### Engine for hydroplane

I have recently made a single-step hydroplane hull which weighs 11 oz. unladen. I want it to run at a speed of 20-30 m.p.h. The dimensions of the craft are: l.o.a. 2 ft; breadth 7 in. The step is 13 in. from the stem and the maximum hull depth is 2½ in. Can you advise me on a type of c.i. engine I could install, and also the pitch and diameter of the propeller?—D.D.H., Hornchurch, Essex.

▲ For a hydroplane hull an engine of 4.5 to 5 c.c. would be suitable—though generally speaking, the glow plug type of engine will be found more satisfactory for this work. Its only disadvantage compared with the latter is that it requires the use of a low-tension battery to start it.

Suitable engines can be obtained from Ripmax Ltd, 39 Parkway, London, NW1. This firm would also be able to

recommend a suitable propeller for the type of engine selected. It should be possible to obtain the performance specified with a well-designed hull of the stated dimensions, but a great deal will depend on details of design and also on adjustment of trim and thrust angles, which may call for some experiment.

### Engine reconstruction

I have recently picked up an ancient gas engine of the type reconditioned by Edgar T. Westbury and described in Vols 105 and 106. It is in a pretty sad state with some parts missing, but with the help of those articles I feel confident that it can be successfully rejuvenated. There is, however, one point on which I would appreciate advice.

The cylinder, piston and rings are in fairly good condition but the back end of the cylinder and the port, as also the greater part of the valve chamber, have been filled with lead, the plug in the cylinder being approximately ½ in. thick. No doubt this was done to increase compression, but I wish to find a way to obviate the employment of such crude methods. The new connecting-rod could be lengthened, but at maximum angularity it would foul the mouth of the cylinder, as also would an increase in the stroke.

Any help you could give me to overcome this difficulty would be appreciated.—J.A.W., Eastleigh, Hants.

▲ It is agreed that the use of lead or any other filling material to increase the compression ratio would be very undesirable, as it would certainly tend to cause the engine to overheat by retarding the conduction of heat to the cylinder walls and head.

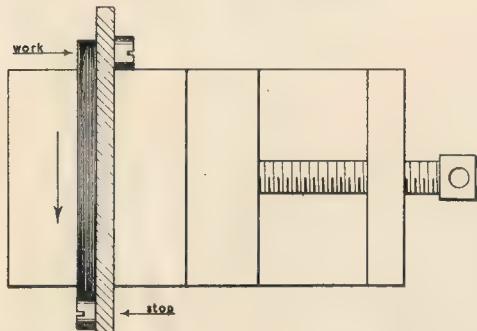
The best method to increase compression would be to make a new piston of a greater length so as to decrease the clearance space. But in order to enable the same length of connecting-rod to be used and thus avoid any risk of fouling the mouth of the cylinder, the gudgeon pin would have to be placed nearer the skirt end of the cylinder than the usual position at mid length.

This could be done without greatly increasing the weight of the piston and it would avoid the undesirable features mentioned.

WHEN taking a cut in a piece of material held lengthwise in the machine vice, the work is liable to slide in the vice jaws and become damaged. This can be prevented by making use of a stop of the kind shown in Fig. 13.

A series of threaded screw holes is spaced at equal intervals along a length of  $\frac{1}{2}$  in. mild steel strip and the width of the stop bar is made equal to the height of the vice jaws. When the stop is in use one screw head abuts against the vice jaw and the other forms a stop screw for the work to prevent endwise movement.

Where a heavy surfacing cut is taken or a vertical face is being



machined, the tool must be given relief so that it can rise and clear the work surface on the idle, return stroke by the hinge action of the clapper box.

As depicted in Fig. 15 this relief can be obtained by rotating the clapper box so that the tool points towards the machined surface on the work.

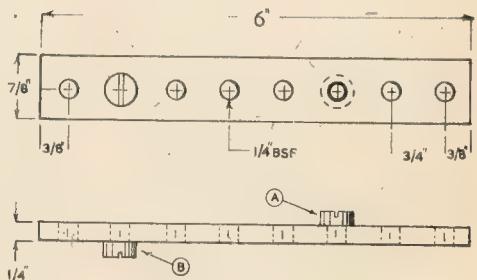
When carrying out a surfacing operation on a piece of material, it may be noticed that if the tool is traversed back to its starting point

## THE WORKSHOP

# SHAPING MACHINE

**DUPLEX** continues his series with further details of the clapper box construction

Left, Fig. 13: A work stop used in the machine vice



Right, Fig. 14: Details of the work stop

while the shaping machine is still running, shallow cutting marks are formed on the work surface. This is due to the tool gradually falling and taking up the backlash in the feed mechanism on the forward cut. To prevent this detrimental self-feed, which will upset the accuracy of the machined surface, either the tool slide must be adjusted stiffly enough to remain unaffected by the vibration set up during machining or, better

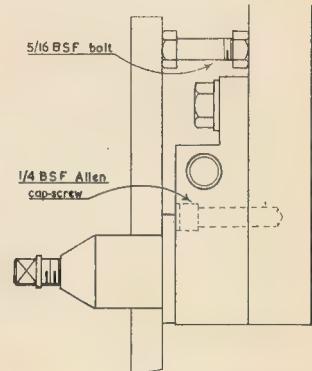
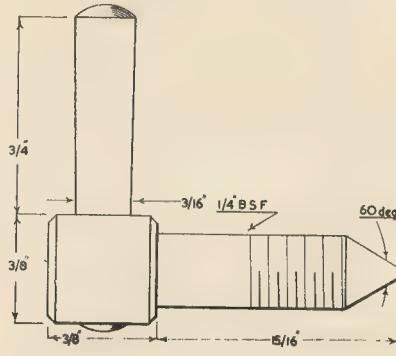
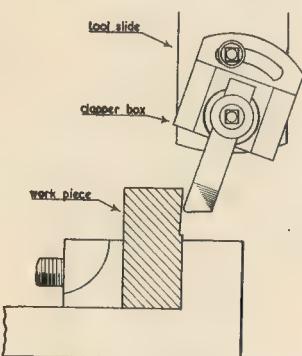
still, the slide should be locked after the downward feed has been put on at the start of each cut.

For locking the slide one of the gib adjusting screws is replaced by a specially-made screw fitted with a finger lever to enable it to be firmly tightened during the actual machining operation. To avoid interfering with the gib screws the locking screw (Fig. 16) is preferably fitted in one of the intervals between these screws,

Fig. 15: Tool relief obtained by setting over the clapper box

Fig. 16: The locking screw

Fig. 17: Two ways of locking the clapper box



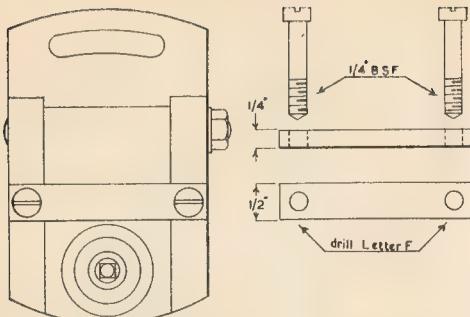


Fig. 18: Locking the clapper box with a strap

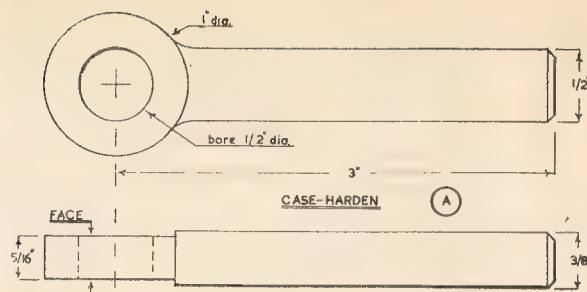


Fig. 20: The swivelling tool body

and it should be located so that it always presses against a part of the gib strip that is in contact with the sliding member of the tool slide, otherwise the gib strip may be distorted and even permanently bent when the locking screw is tightened.

It will be found that the feed screws of the tool slide and the table slide, can be more easily operated if fitted with handles of 3 in. radial length.

#### LOCKING THE CLAPPER BOX

Although for most work setting over the clapper box will afford the necessary relief for the tool on the return stroke, when operations such as undercutting a vertical surface are carried out in the shaping machine, the tool on the idle stroke will be prevented from rising and will tend to jam in the work.

To overcome this difficulty the clapper box can be clamped so that it remains fixed on both the cutting and the return stroke. Admittedly, the tool will then tend to rub against the work surface on the idle stroke, but if the tool is sharp and cuts cleanly this is a matter of little importance and the cutting edges will not be appreciably blunted unless the machining operation is very protracted.

There are several ways of immobilising the clapper box and that illustrated in Fig. 17 is perhaps the simplest method. Here, a short bolt is placed between the tool shank and the tool slide, so that these two parts are forcibly separated by unscrewing the nut on its bolt.

Another method, also depicted in Fig. 17, is to fix the clapper box to the tool slide by means of a  $\frac{1}{4}$  in. Allen capscrew, which is inserted clear of the tool post in the position shown in the drawing. A third method is that shown in Fig. 18, where a steel strap is secured in place with two screws to lock the clapper box in its housing.

#### SPECIAL TOOLS

The tool illustrated on the left of Fig. 19 has the advantage that the tool head can be swivelled for cutting in either direction on a flat surface or against a vertical face. To save material the shank of the tool was made from a discarded cycle crank, and the clamping device consists of a cross-drilled collar fitted with a draw-bolt. All the components should be case-hardened to resist wear.

This toolholder was originally made to take  $\frac{1}{2}$  in. dia. round, high-speed steel tool-bits but, after softening the

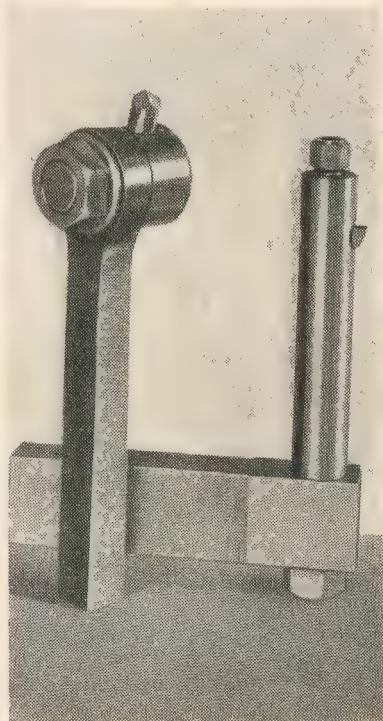


Fig. 19: A swivelling toolholder; Right, a keyway-cutting tool

collar and the draw-bolt, the tool housing was later enlarged with a square-sided broach to enable square tool bits to be securely clamped in place.

Tool bits of the kind referred to can be obtained commercially in the hardened and heat-treated condition ready for grinding to shape. A further advantage of this form of construction is that chatter is largely prevented by the tool being able to spring away from the work surface in the event of the cutting pressure becoming excessive.

● To be continued

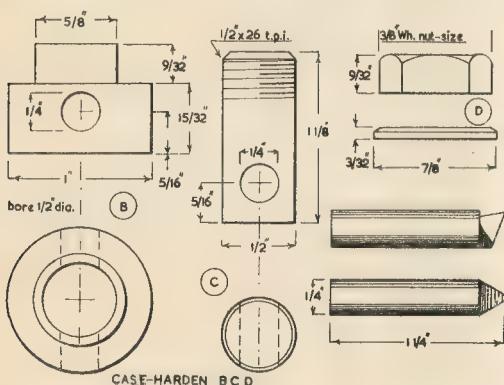


Fig. 21: The swivelling tool parts. B the clamping collar; C and D the draw-bolt

# A WORKING MODEL OF ST NINIAN

By EDWARD BOWNESS

Part 18—This instalment contains some further comments on the lifeboats and a description of the gravity davits with instructions and drawings for making them

Continued from 22 August 1957, pages 273 to 275

THE name of *St Ninian* should be painted on the port quarter and the port of registry—Aberdeen—on the starboard quarter, as shown at A (Fig. 77). The numbers of the boats are painted on the bow, these being 1, 3 and 5 on the starboard side and 2, 4 and 6 on the port. Nos 1 and 2 are the forward boats.

The life lines must now be fitted; these are threaded through tiny eyes just below the beading or rubbing strake. The cord should be just thick enough to hang properly. To ensure this it is advisable to give it a dressing of varnish—and before it sets curve the loops symmetrically. Nothing looks worse in a model ship than a lifeboat with its life lines hanging forlornly.

It is quite possible that some of the builders of the model of *St Ninian* will consider that the lifeboats, if made as described in the last instalment, are unnecessarily complex for a working model. At one time I used to underestimate the ability of the model maker to produce closely detailed work and also his desire to do so.

After studying the subject for many years and also from the number of marvellously detailed models I have seen I have come to the conclusion that there is always a certain proportion of builders who are satisfied with nothing less than perfection.

I would be the last person to claim that the model of *St Ninian*, as I have described it, represents a perfect model. It is correctly proportioned and has a reasonable amount of detail, but certain items have been omitted and others simplified because it is designed as a working model and will have to stand up to wind and weather conditions when sailing.

The question of the lifeboats is one for the builder to decide for himself. I have described a reasonably detailed boat which will give a fairly accurate

impression of the real thing. If the builder's spare time is limited, or if his interest is in operating rather than building his model, he could carve his boats from the solid, hollowing them out a bit for lightness if need be, and show them with their canvas covers in place. If he represents the planking by strips of Bristol board glued on to the wooden shell the effect will be quite satisfactory so long as he retains the correct shape and builds accurately to the lines.

Alternatively he could show five of the boats in this way and build the sixth in full detail as described, leaving this one without its cover and including the standard equipment, on the assumption that one boat should always be ready for immediate use. After all, the hull of the model itself is only correct externally. Internally the accommodation for passengers and crew is non-existent, and the power plant is not in any way a copy of that in the ship herself.

The equipment which must be carried in the lifeboat to comply with the Board of Trade regulations consists of a mast and two sails, rudder and oars, with two spare oars and a steering oar in case the rudder is damaged. Other items such as a compass, a sea-anchor, various items of food, and other necessities, are stored in the lockers and need not concern the model maker.

The canvas covers on the lifeboats on *St Ninian* have six triangular extension pieces on each side with ropes attached for securing them under the boat's keel. These are seen in the picture on page 582 [April 18]. Holes are provided toward each end to enable the boat's falls to be hooked on to the eye bolts provided in the boats. To support this cover a wooden frame is placed over the boat with crosspieces about 3 ft away from the stem and stern, and a ridge pole fixed longitudinally between them. The frame is clearly shown in the picture on page 273 [22 August] and one should be made for each boat to

ensure that the cover is stretched neatly over the boat.

## DAVITS AND THEIR FITTINGS

The davits for the lifeboats on *St Ninian* are of the modern gravity type, and their representation in model form could be one of the most interesting of the many problems encountered in making a realistic model of the ship. They are made by Schat Davits Ltd, of London Colney, Herts, who have been most helpful in sending me photographs and leaflets describing the principles of their davits, and detail drawings of the davits actually fitted on *St Ninian*.

The two forward boats, Nos 1 and 2, are carried on special low type gravity davits, the tracks of which are mounted on the boat deck, see Fig. 80. The movement of the davit arm is controlled by two pairs of rollers, the one at its lower end working in the lower inclined track and the other in the upper or main track. The effect

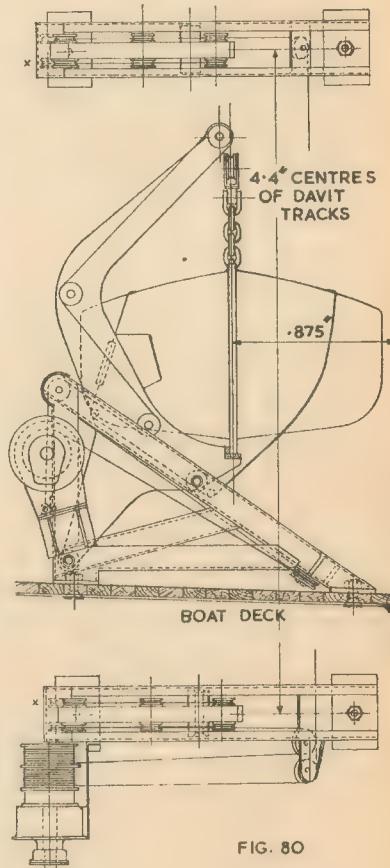


FIG. 80  
Fig. 80: Starboard davit for forward boats

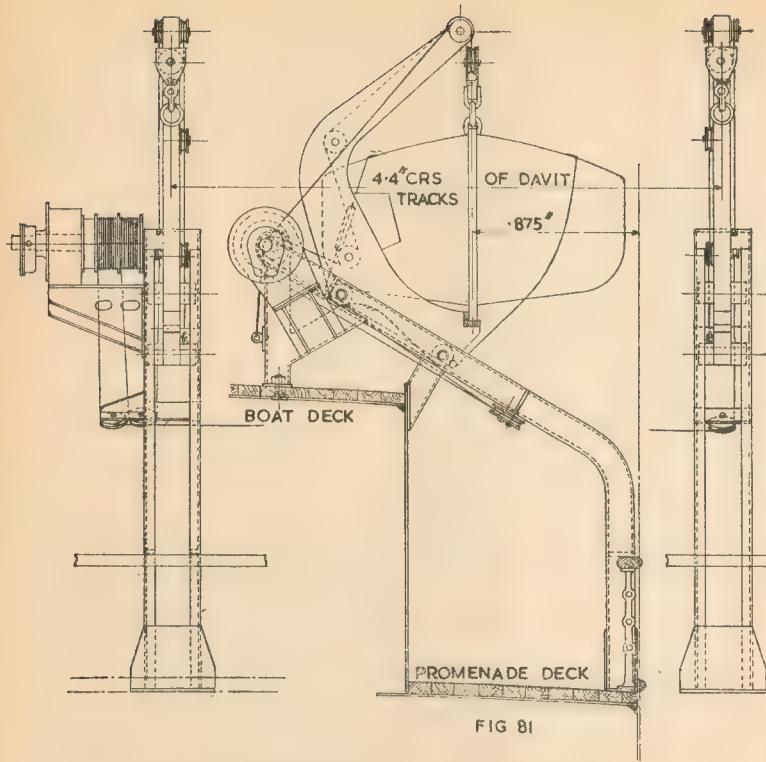


FIG 81

Fig. 81: Starboard davits for the four after boats

of the two tracks is very ingenious and the track itself is very compact.

The four remaining boats, Nos 2, 3, 5 and 6, are carried above the promenade deck in Schat davits of the more normal gravity type, with curved tracks, see Fig. 81. The inner ends of the tracks are mounted on the boat deck and the outer ends are brought down to the rail of the promenade deck. The arms have the normal two pairs of rollers and the outward movement is produced by the curve of the track tilting the arms in the usual way.

In both types when the boat is stored its keel rests on projections on the davit arms and the side of the boat bears against wooden blocks on the outboard face of the arms, being held firmly against them by gripes at each end of the boat. The gripes are tightened by stretching screws and each is provided with a type of Senhouse quick release slip.

The davit arm is secured by a link which engages with a hook operated by the hand wheel at the inboard end of the track. The hooks and gripes are controlled by the Catapult Release Gear, which ensures that as soon as the boat reaches the inboard position it is securely held independently of the falls. This enables the falls to

be slackened off after the boat has been stowed and gripped. The Schat Catapult Release system enables one man to bring the boat from the stowed inboard position to the full outboard position by two simple operations and literally in a matter of seconds, with the boat left riding on the hand brake ready for instant swinging out.

These details, however, need hardly concern us in a working model and at the scale to which we are building. All the same it is highly probable that some builders will, sooner or later, wish to operate the lifeboats by radio control, and with this in mind I propose to describe how to make davits in which the arms will work in the tracks and with means for securing the boats in position with gripes.

#### MAKING THE TRACKS

Commencing with the two sets of davits on the boat deck the tracks must first be made. Each boat requires two double tracks and each double track requires four channels, two 2.1 in. long and two 1 in. These are fabricated from tin-plate 0.012 in. thick and are of channel section 0.133 in. wide with flanges 0.05 in. deep. The ends must be cut to the angles shown in Fig. 80 after which they should be assembled with an

L-shaped member, which is flanged on its two outer edges, see Fig. 82.

They must be made in pairs with the flanges of the channels facing inwards and a space of 0.19 in. between the flanges. They are tied together by flat plates  $\frac{1}{4}$  in. wide  $\times$  0.4 in. long soldered across the bottom and a curved plate at the upper corner. The length of the projection at the angle of the L-piece should be such that the lower member is horizontal and not parallel to the angle of the deck; the sole plates, however, must be made to suit the camber of the deck. Holes should be drilled in the channels where shown for assembling the rollers on the arms. Before assembly, two small stop pieces must be soldered in the inside of each channel, as shown in Figs 80 and 82, to limit the movement of the arms.

#### DAVIT ARMS

The davit arms are cut from a sheet of 12 s.w.g. duralumin or aluminium approximately to the shape shown in Fig. 80, which is reproduced the exact size for the model. A steel template should be made for the final filing to shape as four are required. If one tries to file them to shape



Davits on starboard side as seen from the top of the wheel house

# ST NINIAN

continued

using the first as a template there is every possibility that too much will be filed away in places, especially with the soft metal. The template must be fitted with two pins in holes which correspond with the holes for the roller spindles. These holes should be drilled in the rough blanks so that they can be used for locating them when filing to shape.

The three upper holes in the arms are for the guide pulleys for the falls. At this scale the guide pulleys need not revolve but can be riveted one on each side of the arm. They act merely as grooves to guide the falls and for this reason the grooves should be reasonably deep to prevent the falls from coming off.

The two lower holes are for the spindles of the rollers which work in the tracks. The rollers should be an easy fit in the tracks and they should be of such a length that they run easily between them when assembled on the davit arms. The expert might be able to make the spindles a tight fit in the davit arms and the holes in the rollers an easy fit so that they revolve. But for the model it is not really necessary that they should revolve. To simplify matters it would be better to merely slip them on the pin which goes through the arm and to burn over the ends of the pin so that it will not work loose.

As the track is assembled before fitting the arm the rollers must be placed in the channels opposite the holes and the pin inserted through them and through the arm, after which the ends of the pin must be burned over by means of a fine punch inserted through the holes in the channels used in connection with a dolly of similar size in the hole in the opposite channel.

## TRACKS FOR AFTER DAVITS

The tracks for the remaining four davits are made to the shape shown

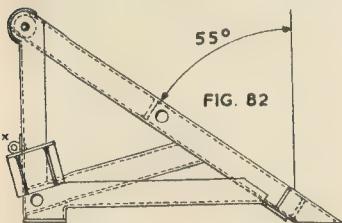


Fig. 82: Detail of track for the forward davits

MODEL ENGINEER

in Fig. 81. As there are 16 individual channels to be made it is advisable to make a simple jig for them. The jig is merely a strip of 10 s.w.g. steel plate about  $\frac{1}{2}$  in. wide and 5 in. long bent to an angle of 120 deg. at 2 in. from one end, the inner radius of the bend being  $\frac{1}{2}$  in. Strips of tin-plate  $\frac{1}{2}$  in. wide are then cut to the shape of the track as shown in Fig. 81, the  $\frac{1}{2}$  in. including an allowance for flanging. Two of them are clamped to the jig as shown in Fig. 83 with the surplus width overhanging equally on either side. They should then be peened over each edge with a light hammer to form the channel.

The clamps can be moved along as the work proceeds providing sufficient of the strip is already flanged to locate the strip in the jig before any clamp is moved. Eight pairs are required and if they are made in the manner described there need be no mistake. When finished the flanges must be filed to the correct width and the ends shaped to the drawing. Two holes

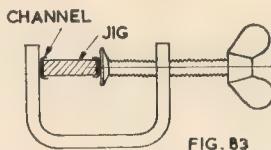


Fig. 83: Clip for flanging channels

must be drilled in each channel for assembling the arms and two stop pieces must be soldered on the inside to limit its movement, in the positions shown in Fig. 81.

The Y-shaped piece at the inner end of the track—see Fig. 84—should be cut out and flanged on its inner and lower edge and soldered in position, as should also the short strut supporting the track from the corner of the promenade deck house. The channels are tied together at their inner ends by a sole plate 0.15 in. wide  $\times$  0.4 in. long and at their outer and lower ends by a similar plate 0.15 in. wide  $\times$  0.45 in. long with the addition of gusset plates soldered on the inner and outer flanges of the channels.

These two sole plates are slightly angled to suit the camber of the deck. A third sole plate is soldered across the two struts and on final assembly this is soldered to the upper face of the deck house. The top corner of the track is covered by a curved plate as with the davits already described.

## ARMS FOR AFTER DAVITS

The davit arms are similar to those for the forward pair but their shape is not quite the same owing to the

different method of operation. Also the upper part, which one might expect to be the same, slopes upward at a smaller angle than the arms of the forward davits. They should be made from the same material as the others and filed from a steel template, which in this case is even more worth

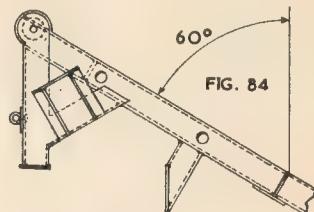


Fig. 84: Detail of track for the after davits

while making as eight arms are required. The arms are fitted with track rollers and guide pulleys as already described for the two forward davits, and they are assembled in the tracks in exactly the same way.

## HOISTING WINCHES AND BRAKE DRUMS

The hoisting winches and brake drums are the same for all six sets of davits, and in each case they are located at the after end of the davits. This must be kept in mind when fitting the brackets for carrying the winches and when fitting the guide pulleys for the falls, and the eyes to which the fixed ends of the falls are attached. The drawings, Figs 80 and 81, show the davits for the starboard side of the vessel; those for the port side must be made to the opposite hand.

The bracket for carrying the winch is soldered to the outside of the after track in the position shown in the drawings. The platform, which is inclined when viewed from aft, is supported from the base by two webs. The brackets for the four after davits are deeper than those for the forward ones and the platform and the outer web are drilled to clear the falls as they leave the winding drum, as will be seen in Fig. 81.

The guide pulleys are merely grooved discs riveted or soldered to a plate which is situated under the tracks and spans both channels. There are two pulleys on the after track but only one on the forward one. The drawings will explain the arrangement. The eye for receiving the fixed end of the fall is riveted into a plate which is soldered across the inboard face of the forward track of each davit.

● To be continued

# POSTBAG

## THOSE TANGYES

SIR,—I am in no way a model engineer, nor a professional one, my main interests being photography and radio, but I do see your magazine and I always become absorbed in it.

Your correspondent, Mr Perrem, wrote an interesting letter [Postbag, August 15] concerning a Tangye stationary engine in the Transvaal, and he wondered how it came to be there.

I cannot explain the presence of that particular engine, but being connected with a firm of export packers it may interest Mr Perrem to know that over the past eight years or so I have seen quite a large number of Tangye and Ruston engines of this type, in various forms of degeneration, passing through the works, destined to India and points East, where, I am given to understand, they still do sterling work, probably in simple irrigation schemes.

It is no wonder that specimens are scarce at home, for I know of at least two Indian gentlemen who comb the English countryside to root them out—and they are still finding them and putting them to work!

Woodford Green, R. DENTON, Essex.

## LBSC'S NEXT

SIR,—May I be permitted to butt in on the suggestions for LBSC's next locomotive?

I have been a follower of Curly since the days of the "Battle of the Boilers" and the trials at Caxton Hall. I was still at school then and that is all of 35 years ago and to the best of my knowledge the present engine *Zoe* is the first locomotive he has described for a 3 ft 6 in. gauge in all that time.

The majority of his engines have been 4 ft 8½ in. gauge British types, with a few American types. Now, how about giving us 3 ft 6 in. gaugers a break?

The locomotive I have in mind is a South African Railways class 10B, which, with a few slight modifications, could be altered to a New Zealand Railways class Q or class A; a Japanese 4-6-2 type; or a Sudan Govt Railways class 4-6-2.

All these engines are similar in general appearance and are all 3 ft 6 in. gauge. The model could also be

used as a basis for a Western Australian or a Federated Malay States locomotive.

In 3½ in. gauge, this locomotive would be 1 in. scale and as it is not a massive type, it would be comparatively easy to manhandle.

The feed water pump next to the cab was an experiment and was soon taken off and the big square headlamp gave place to a Pyle National lamp, which looked much better. The boilers and cylinders were lagged in polished blued steel, now, alas, painted black, and they were lined in double red lines. A really fine-looking job.

The prototypes were built by the North British Locomotive Co. and Beyer Peacock and Co.

Should such a locomotive be considered I am in a position to supply

The Editor welcomes letters for these columns, but they must be brief. Photographs are invited which illustrate points of interest raised by the writer

Richards of Lowestoft cannot give me any assistance. I wonder if any of your readers could help.

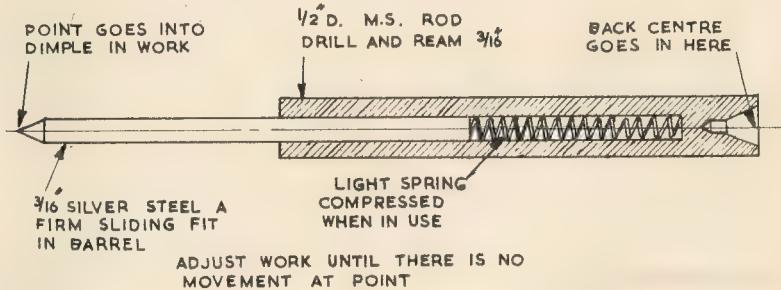
What I require is a dimensioned drawing of the deck and superstructure, mast, spar and sail plans. This I hope to make a working model to go with a series of sailing drifters and trawlers all to ½ in. scale.

Sheringham, RALPH NEVILLE, Norfolk.

## CENTRE FINDER

SIR,—Regarding "a centre finder" described by J. Nixon [ME, June 20] I would like to mention a simple but effective centre finder which I use.

It was described in the ME some years ago (not by me!) and I'll guarantee that it is as good as any others of a more complicated construction; better in some respects



The simple centre finder described by G. J. Gable

prototype drawings and photographs which would aid in the building of a small version.

Johannesburg, D. F. HOLLAND, S Africa.

A picture of South African Railways class 10B Pacific appeared on page 173 of August 1 issue.—EDITOR.

## INFORMATION SOUGHT

SIR,—Some years ago I bought in Lowestoft a builder's half model of an 88 steam herring drifter (c. 1910-14).

I am building the hull in the proper way—timbers and planking. Up to the present I have been unable to obtain any information of the rest of the boat.

I have advertised in the *Eastern Evening News*, but have received no reply.

because it has not any pinned joints, etc., to wear.

I am not writing this in criticism of Mr Nixon's effort but I really can't see that such elaboration is necessary.

Enclosed is a sketch of it. Orpington, Kent. G. J. GABLE.

## OLD LINES

SIR,—I suggest that the rail shown on page 248 [ME, 15 August 1957] is one of the kind introduced by William Barlow, engineer of the Midland Railway, *circa* 1850. Brunel used them on the West Cornwall Railway and on part of the South Wales Railway. There are many references in MacDermot's *History of the Great Western Railway*.

Short lengths can still be seen in use as drain covers on the GWGC Joint line and I once saw some used

# POSTBAG . . .

to support the decking of a derelict swing bridge over the Kennet and Avon canal. Some years ago there was quite a pile of these Barlow rails at Swindon and it appears that they still have their uses!

Amersham, J. PRITCHETT,  
Bucks.

## BEAM ENGINES

SIR.—I was very interested in the letter by Frank D. Woodall [August 22] commenting on the Old Ben beam engine and also the example of the Vulcan engine recently illustrated in these columns.

Mr Woodall undoubtedly has a unique experience of old type engines and I have the greatest respect for his opinions, but I am rather perplexed by his question "which of the two . . . has the most right to be kept in a museum?" This question, in my opinion, does not arise, as one is an actual full-size oldtimer, and the other an individual, and rather free, adaption of an ME design for a simple model beam engine to suit amateur constructors.

The Vulcan design is not copied from any particular engine, but is based on the practice of the early 19th century, and I have done my best to keep to this as faithfully as possible, avoiding anachronisms or errors of proportion. If I have slipped up on any details of design, I would welcome constructive criticism by any readers who may be better informed in these matters.

The twin version of the Vulcan design by J. Don, illustrated in the July 4 issue, was extremely interesting, and I am generally in favour of individual variations on the theme of a published design. As I was not invited to criticise this example, I have not offered any comment so far, but now that the subject has been broached, I would observe that some of the details differ from my original design, and in particular, I think it is a pity that such a heavy flywheel, out of character with period design, has been fitted. Apart from that, I commend Mr Don on his effort.

I would also take this opportunity of commenting on the Perspex version of the Vulcan by Sir W. Guy Fison, also in the July 4 issue. While the use of an uncharacteristic material undoubtedly destroys the fidelity of the model, it does not by any means condemn it from the model engineering aspect. Perspex, by introducing facilities for producing transparent

working parts, has produced a new means of making very interesting and instructive demonstration models, and I think its use for this purpose deserves close attention.

Incidentally, the photograph of Old Ben shows how careful one must be in making dogmatic statements as to what is right or wrong in engine practice of a given period. I had never seen an early beam engine with a sliding crosshead, and had I been asked, I should have dated this engine as a good deal later than the period suggested.

It would appear also that this engine has a swivel-jointed crosshead at the connecting-rod end of the beam, another rather uncommon feature in very early engines.

EDGAR T. WESTBURY.

## ALIGNING CENTRES

SIR.—As the possessor of an early 3½ in. Drummond lathe fitted with swivelling headstock and set-over tail-stock, I may perhaps be permitted to suggest a simple way to set a headstock in true alignment with its bed.

As your correspondent has a Myford ML7 its tail-stock is provided with means for off-setting its mandrel; therefore, I am in disagreement with the test-bar-between-centres method.

I believe Myfords set their headstocks by inserting in the mandrel nose taper a perfect fitting tapered mandrel the parallel extension having ground thereon a flat on which the dial gauge makes contact.

If one does not wish to purchase such an expensive fitting the following method will give equal satisfaction.

Mount the face plate on the mandrel nose and revolve the face against the dial gauge; if there is an error find

the diametrical points which give an exact reading.

Draw a pencil line across as a reference line and below this line, equal to half the thickness of the try-square sole, clamp a short length of angle iron to act as support to the square. It is most essential that this latter is a true 90 deg.

All one has now to do is to lay the side of the stock of the square on the angle-iron support and tightly clamp its sole to the face plate. It is as well before clamping to the face plate to insert under each end of the stock a small section of cigarette paper, which cancels out any convexity of the face plate.

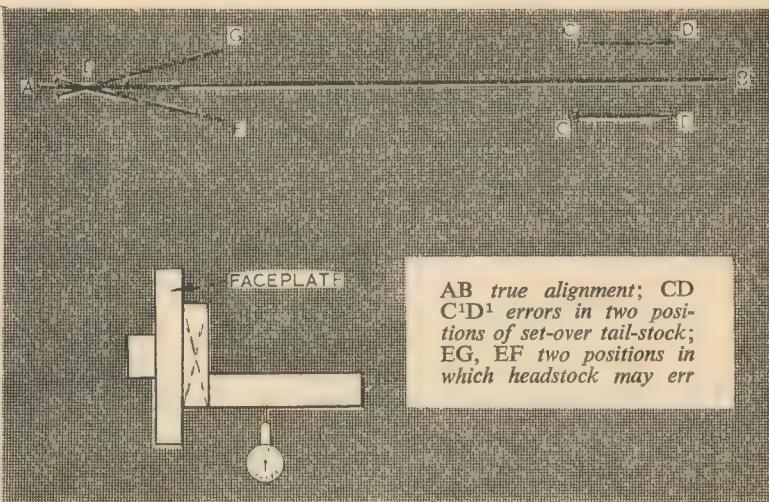
The blade will now extend its length from the face plate and parallel to the lathe bed, allowing the dial gauge to be traversed along its edge and the headstock adjusted till it gives a zero reading at each extremity. Personally I prefer to have + 0.00025 showing at the tail-stock end of the blade, as this ensures that when facing a large diameter the face will err on the concave rather than convex.

I have criticised the test-bar-between-centres method on the ground that a set-over tail-stock may not have been accurately reset, as it's not such an easy matter to get two, perhaps coarse, index lines dead-on, which may mean an error of one or more thou.

If the test-bar is on centres *GC* or *FC*<sup>1</sup> then the headstock will have to take over position *GC* or *FC*<sup>1</sup> to be parallel to *AB*, when it will be apparent that *EG* or *EF* will be out of alignment with *AB* and turn a taper when not supported by the tail-stock.

Once the headstock is corrected on its own, then the test-bar between centres can be applied to check alignment of tail-stock.

King's Lynn. JOHN E. ELAM.



## CASTINGS

SIR.—Of recent dates there have been complaints about inferior castings. I have dealt with A. J. Reeves for some time and I have never had a bad casting from them yet.

I have had wrong orders sent to me, such as three steam chests instead of two, and small things like that, but nothing to warrant making a song about.

I am constructing *Maisie* and am converting her to outside valve gear, which meant an alteration in cylinder patterns, retaining the bore of  $1\frac{1}{4}$  in. and  $1\frac{1}{8}$  in. stroke. I wrote to our friend Wilbau who promptly asked for a pattern to cast them. I have now received the castings, machined them on the port faces and bolting faces, and they are now ready for boring.

If there are any Doubting Thomases I am willing to forward one casting to MODEL ENGINEER for inspection and the other to our friend Wilbau. Most model engineers have modest equipment, so it's obvious that firms who supply castings must bear that in mind, otherwise home machining would be on the down grade.

LBSC recommends Wilbau. I have no connection with any of the above-mentioned firms, but I am most certainly a satisfied customer, and I should have no hesitation of again availing myself of Wilbau's service.

Bishop Auckland, J. H. GLADDEN, Co. Durham.

## STEAM IN USA

SIR.—I presume you realise that model engineering seems to be almost a British monopoly. I know of one company here in California that handles some steam engines, but most of these are your Stuart brand that he imports and re-sells. There is also a company here that sells locomotive kits, but most are to a  $1\frac{1}{2}$  in. scale which is about three times too large for the normal back yard here. That explains the coals-to-Newcastle bit of crossing a continent and an ocean to obtain plans of a locomotive that was developed and used here.

This particular American type is very interesting as it represents a high point of engineering evolution to fit the conditions of track, labour and maintenance available in frontier railroads of its period. There is one American type I know of that was retired only in the last decade after three or four boiler and superstructure changes. It is now in our "Travel Town," but the running gear is still pure American type with Stephenson valve action which is unusual here where Walschaerts, Baker or Southern is the rule or used to be.

Very few, if any, steam locomotives are now used in this country, all seem to be diesel and "air horns." I work as a design engineer in the last steam stronghold, the central power stations, and it looks as if the atom has given steam a fresh start in this field at least. But even here a 200,000 kw. turbine has not half the appeal of a reciprocating machine of one fourth the size.

Los Angeles, JOHN W. MEACHAM, California.

## WHEELWRIGHT'S LATHE ?

SIR.—I enclose a photograph of an ancient left-handed lathe I discovered in an old building which is situated on Weymouth Quay and is shortly to be pulled down.

The bed is within a few inches of the wall of the room and it would be impossible to use it with the headstock in the usual position.

It may be an old wheelwright's lathe, but I can get no information about it.

The flywheel runs very easily, and it is about 6 ft 6 in. dia. I shudder to think what would happen to the turner if he slipped back as the handle is fixed rigid to the spindle ! Weymouth, Dorset. R. H. RICKETT.

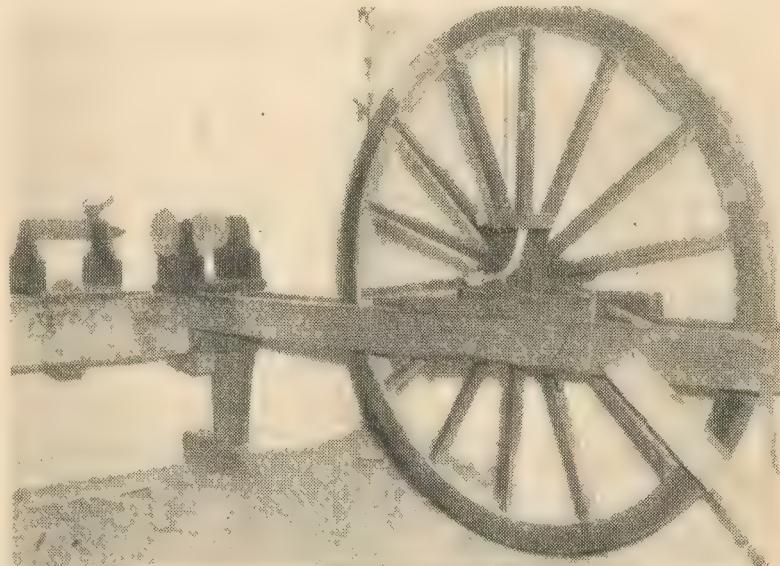
## THOSE RUSSIANS

SIR.—I do not wish to be a kill-joy but, remembering Hungary, do we want those Russians ?

Would we have invited or welcomed the Hitler Youth while Dachau, Belsen, etc., were—literally—in full blast ?

Daily we hear of fresh arrests, repressions and deportations in Hungary. Is it nothing to us—or do we just pass by ?

Edinburgh. W. LOCH KIDSTON.



*The ancient lathe which Mr Rickett discovered in old building on Weymouth Quay*

## THRESHING BY STEAM

WAY down in Trenton, Missouri, a few weeks ago they turned the clock back on old Petterson's farm.

Watched by a crowd of interested sightseers, some of whom had travelled more than 100 miles, Petterson and his friends and neighbours threshed a nine-acre oats field, using a 1916 steam engine as the power unit.

Diesel and electric power is so ousting steam in USA that threshing by this steam tractor, which Petterson has brought out of hibernation for the past three autumns, is becoming an annual "event."

H. K. Petterson, a sprightly 69-year-old with a white goatee, is a great live-steam enthusiast. He has had several of these monsters from the past, which he renovates, re-builds and re-paints to their pristine glory.

The engine he uses for threshing, though not his pride and joy, is a Case 50, built in 1916, which develops 16 h.p.

Reader W. M. Goodrich, of Prairie Village, Kansas, sent us the report of this fascinating afternoon's work, which appeared in the *Kansas City Star*.

# LOCO 1861

## OF HOWE BRIDGE COLLIERY, ATHERTON

JAMES H. FARR contributes these notes on Britain's oldest industrial engine now about to enter retirement at Leith

**H**AWTHORNS and Company, of Leith, Scotland, built a number of locomotives in the nineteenth century for both main-line railways and industrial use, and of the latter the design typified by 1861 appears to have been the most common.

The earliest example known in recent times was built in 1858, and the most recent in 1883. Of these, 1861 is the sole survivor.

Various industrial concerns in Scotland had at one time locomotives similar to 1861, and at least one went to the Madras port authority.

But apart from a main-line type locomotive preserved at Capetown 1861 is the sole surviving example of the products of this firm. She is now to be preserved at Leith.

The line from Howe Bridge Colliery to Bedford Basin on the canal at

Leigh, Lancashire, appears to have been completed in 1857, but for the first year or so may have been worked by horses. At all events, the *Leigh Chronicle* for 1 June 1861 mentions the employment of two new locomotives built for John Fletcher, these being named *Lilford* and *Ellesmere*.

Of these *Lilford* seems to have disappeared at an early date, as a second locomotive of this name was acquired in 1897. *Ellesmere* was retitled 1861 upon the acquisition of another engine named *Ellesmere*.

The maker's plate on 1861 bears the wording: S. D. Davison's Patent. This is presumed to cover the rather unusual form of construction, whereby the well tank forms itself the locomotive frame. This particularly rigid form of construction no doubt partly explains the longevity of the engine.

This feature necessitated the use of outside link motion, a feature rare

in this country, although commonly used at one time on the Continent. Although the engine must have worn out several boilers during her long career, her appearance is almost as it was when she was built 96 years ago, as contemporary illustrations of this type of engine when new bear witness.

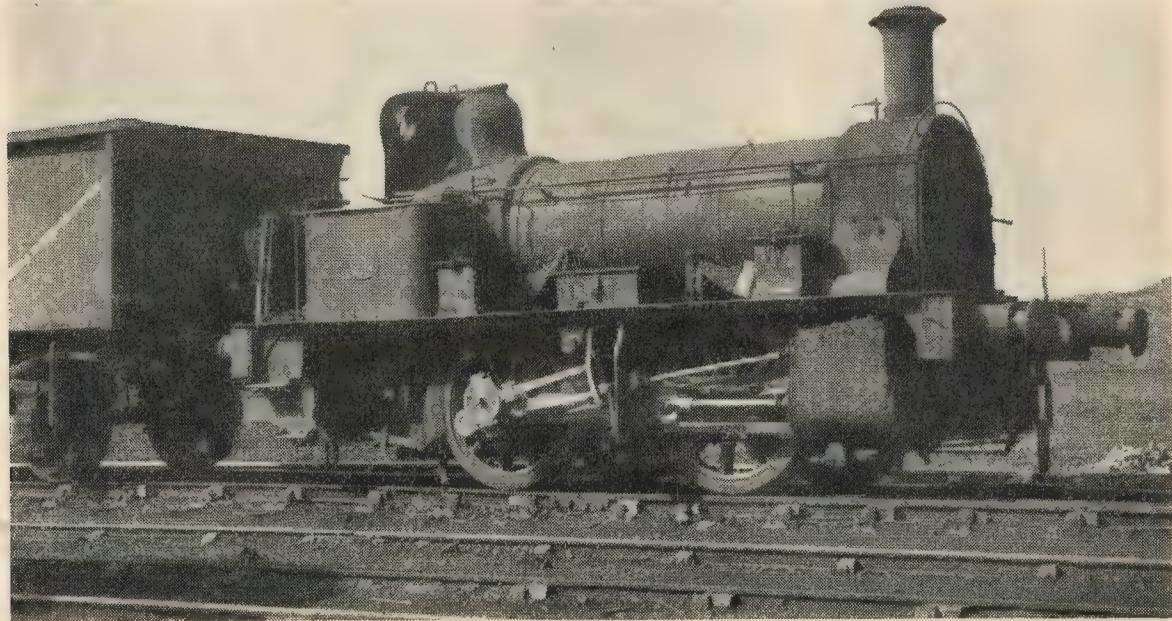
When it was realised that 1861's working days were numbered, members of the Stephenson Locomotive Society, Manchester Locomotive Society and Edinburgh Society of Model Engineers started to formulate plans on her preservation—on the basis of:

1 Her great age.

2 Her unusual design.

3 The fact that she is the sole British survivor of a once very active and well-known locomotive building firm.

4 That she became the oldest working locomotive in the British Isles. □



# CLUB NEWS

## EDITED BY THE CLUBMAN

UNDER the Town Hall at Middlesbrough is a crypt. Model engineers who discover it during the week beginning September 23 will be entertained by the liveliest show in town.

For weeks past work has been going ahead full steam at the headquarters of the organising society, Tees-side SME. The central features of the exhibition will be two layouts belonging to the society itself, one in 4 mm. and the other in 7 mm. fine scale. Both layouts incorporate cab control, and on the 7 mm. layout the points are worked by auto selectors. There will also be at least one layout from the scale car section.

### A happy ending

These attractions, together with examples of the work of individual members, trade stands, and contributions from member bodies of the Association of Model Railway Clubs, should ensure a happy ending to the summer for the old friends who meet again in Middlesbrough.

As some of the visitors will like to join the society, I must add that everyone is welcome at its headquarters, Elmwood, Hartburn, Stockton-on-Tees, at 7.30 p.m. on Wednesdays or 2.30 on Saturdays. Secretary W. O. Carlson, of 28 St Bede's Road, Billingham, will be glad to hear from intending members.

### A PERMANENT TRACK

Tees-side SME is not the only northern club which has an exhibition opening this month. The Wakefield Club is holding one at the hall next door to its new club rooms in Back Lane, Wakefield, opposite Westgate Station.

As well as acquiring these premises, which are large enough to provide a meeting room, a workshop and a room for the Dublo layout, the club has completed an agreement for a permanent railway track in Wakefield Park. Work has already begun there and the exhibition from September 30 to October 5 is an all-out effort to raise funds for the project.

Loans of models from neighbouring clubs and from individual modellers are welcomed by J. Stubbs at 1 Golden Square, Horbury, Wakefield, Yorkshire. As a permanent track in the park is a handsome asset to Wakefield, the local public can do no better

than show their gratitude in advance by attending this show.

### POWER BOATING, TOO

Britain's North Country is also showing what it can do in the way of model power boat running. Altrincham MPBC opens its annual regatta at 12.30 p.m. on September 9 at Lindow Common, Wilmslow.

There are 500 yd circular course events for Class A, B, C and D hydroplanes and a steering competition for straight-running craft, the order being decided to suit the entries on the day. Winners will receive the club's silver cups and other awards.

You will find Lindow Common about a mile from Wilmslow on the Wilmslow-Altrincham road. The lake lies on the side farthest from the highway. It seems to me that visitors had better bring sandwiches. Secretary D. Innes of 122 Downham Crescent, Prestwich, Lancashire, promises competitors and friends a cup of tea.

### THE NATIONAL RALLY

In the Midlands, model engineers are talking about the National Rally at Campbell Green organised once again by Birmingham SME. It opens two days from now and readers will join me in wishing it all the success that it deserves.

Most readers in Britain already know a good deal about the rally, but those who are visiting it for the first time may be helped if I explain that Campbell Green is in Horse Shoe Lane at Sheldon, Birmingham, and that tickets may be had from J. E. Guy, of 21 Kenwood Road, Birmingham 9. Refreshments are provided and motorists will find a car park waiting for them.

### VARIED PROGRAMME

Given a good-tempered sky, the open day to be held by North London SME on September 15 will be as full of activity and interest as we expect of any event arranged by this enthusiastic club.

The miniature car track, the new Cochran boiler built by the live steam section, static displays of other models, and possibly flying by the Aero Section—all these have a part in the programme. Needless to say, the loco section will be there with its

track. The new extension now reaches to about 900 ft and visitors will admire the work which has gone into its construction.

To see the show go to the Barnet and District Water Company's Sports Ground at Rowley Lane, Arkley, near Barnet—no great distance from King's Cross.

### CLUB DAY AT ELTHAM

After a busy season with the portable track, Eltham and District LS is arranging a club day this month at its permanent track in Avery Hill Road. Tonight at 8 p.m. the members meet for a general discussion at the Beehive.

### ME DIARY

September 5 Eltham and District LS general discussion night, Beehive, 8 p.m.  
IEE Supply Section in Belgium (Sept. 5-9).

September 6 Rochdale SME "Building the Seal," H. Bonsor.

Manchester SME meeting, Onward Hall, Deansgate, 7.30 p.m. Film show.  
North London SME general meeting, ER Gas Offices, Station Road, New Barnet, 8 p.m.

September 7 NAME meeting, Onward Hall, Deansgate, 2.30 p.m. Following business film "Story of Steel" will be shown.

Birmingham SME national rally, Campbell Green (September 7 and 8).

September 8 Cancelled: West London MPBC regatta, Round Pond, Kensington.

IRCMS, Kingsley Hotel, London, WC1.

MPBA Altrincham regatta.

September 9 Altrincham MPBC annual regatta, Lindow Common, Wilmslow Common, Wilmslow, Cheshire, 12.30 p.m.

Institution of Designing Engineers, North-East Branch. Chairman's address Northern Agricultural Association Hall, 6 Higham Place, Newcastle upon Tyne, 7.15 p.m.

September 13 Birmingham SMS, "The Panama Canal," Capt. F. J. Marsden.

September 14 Huddersfield SME club invitation weekend (September 14 and 15).

Birmingham SME Boy Scouts Day, Campbell Green.

Northolt MRC annual exhibition, Northolt Village Community Centre, 2-8 p.m.

September 15 MPBA Blackheath regatta, Cleary Cup.  
Birmingham SME Members' Social Day, Campbell Green.

Another event in the London area has been cancelled: the regatta which West London MPBC had intended to hold at the Round Pond in Kensington Gardens on September 8.

Better news for model power boat enthusiasts comes from Blackheath MPBC, whose regatta is on September 15. Blackheath is offering a special award, the Cleary Trophy, to encourage inter-club competition. Of this and the newly-formed Railway and Steam Locomotive Preservation Society I shall have more to tell in the near future.

# Model Engineer

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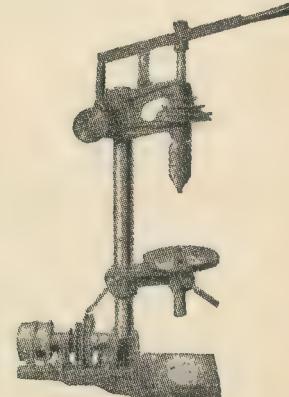
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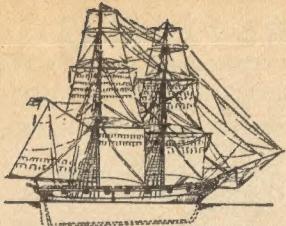
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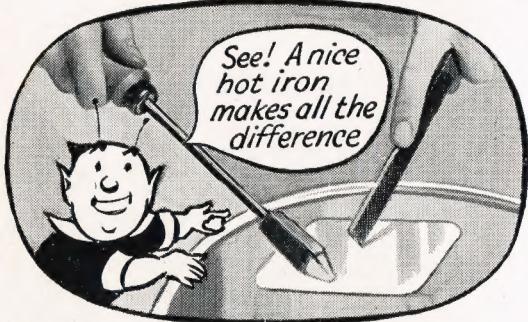
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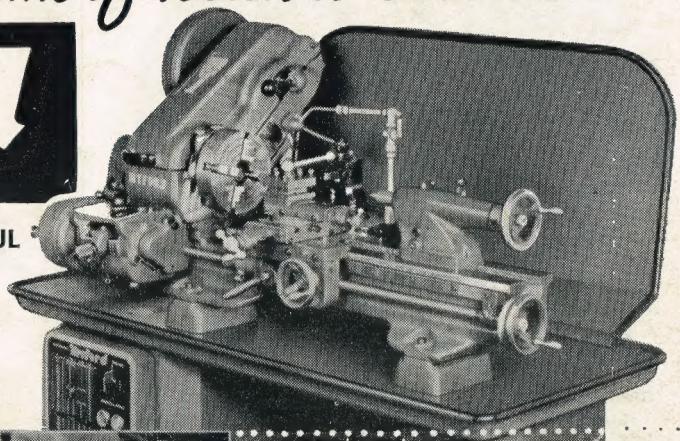
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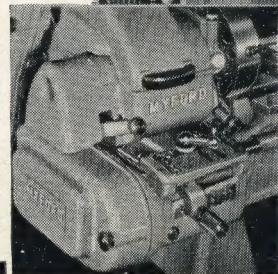
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